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C. A. B.
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FILE

Al-Azawi (A. F.). **Prevention of Scolytus multistriatus transmission of Ceratocystis ulmi, the Dutch Elm disease fungus, by systemic insecticides.**—*Diss. Abstr.*, **20**, 10, p. 3907, 1960.

At Univ. Wis., *S. multistriatus* contaminated with *C. ulmi* [**37**, 683] were confined in cages on randomly selected branches of elm trees, some of which had been injected with insecticides. From trees developing Dutch elm disease symptoms cultures were made to confirm fungus infection. Chipman R-6199 was the most effective of the insecticides tested, giving a beetle mortality of 91% when applied at 10, 20, and 30 g./tree (2 in. d.b.h.).

Globa-Mikhaĭlenko (D. A.). Биологический метод борьбы с чернильной болезнью Пробкового Дуба. [A biological method of control of the ink disease of Cork Oak.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 7, p. 35, 1960.

This disease (*Phytophthora cinnamomi*) [map 302], present on 50–60% of the cork oak trees [*Quercus suber*] in some plantations in the Black Sea coastal area, can be controlled effectively by grafting healthy scions on Iberian oak [*Q. falcata*]. Of 1,250 grafts examined not one was infected, though the disease was widespread in trees on their own roots.

Itô (K.), Terashita (T.), & Hosaka (Y.). **Variation in shape of conidia of Cercospora platanifolia Ellis et Ev.**—*J. Jap. For. Soc.*, **41**, 6, pp. 229–237, illus., 1959. [*Biol. Abstr.*, **35**, 13, p. 3169, 1960.]

Observations from For. Exp. Sta., Tokyo, showed that *C. platanifolia* has conidia of both the *Cercospora* and the *Stigmina* type. Between these two many transitional conidia are observed, and all types can be produced successively. On infected *Platanus* leaves there are both necrotic spots and sooty lesions, the former usually on young succulent leaves, and the latter on mature hard leaves. In early Sept. most of the conidia on both kinds of lesions are *C.* type, interspersed with a few *S.* Later the latter increase and *C.* decreases. In mid-Nov. most conidia on both necrotic and sooty lesions are *S.* type. This change occurs more rapidly on the sooty lesion than on the necrotic spot. The perfect state, a *Mycosphaerella* [**30**, 549], which morphologically does not conform to either *M. platanifolia* or *M. stigmina-platani*, is rarely found on overwintered diseased leaves in spring. Overwintering is mainly by *S.* conidia.

Smarods (Yu.). Интересные виды грибов Латвии. [Interesting fungus spp. of Latvia.]—*Bot. Mater. (Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.)*, **13**, pp. 241–243, 2 fig., 1960.

Four spp. are described, including *Septogloeum populiperdum* [cf. **38**, 427], forming large grey-brown leaf spots, at first zonated, on poplar (*Populus deltoides* and *P. canadensis*). The stromata under the cuticle of the upper leaf surface are 120–250 μ diam., white, packed closely, bursting open, often coalescent; conidiophores up to $60 \times 3{\cdot}5$–$5\,\mu$, cylindrical, single or slightly ramified, 1-celled or with 1 septum, colourless; conidia 15–45×5–$7{\cdot}5\,\mu$, spindle-shaped, thinner at the top, rounded at the base, or cylindrical, straight or slightly bent, with 1–3 septa, often constricted in the middle, colourless.

Thomas (G. P.), Etheridge (D. E.), & Paul (G.). **Fungi and decay in Aspen and Balsam Poplar in the boreal forest region, Alberta.**—*Canad. J. Bot.*, **38**, 4, pp. 459–466, 1960.

In a survey from For. Biol. Div., Res. Branch, Dept Agric., Ottawa, 73% of 835

Populus tremuloides and 61% of 527 *P. balsamifera* in 47 plots of mixed forest were found decayed. On both hosts *Fomes igniarius* [**38**, 39; **39**, 128 *et passim*] was the principal pathogen, most of the remaining decay in *P. balsamifera* being caused by *Pholiota destruens*, and in *Populus tremuloides* by *Corticium polygonium* and *Radulum casearium*. Most basal infections in *P. tremuloides* were due to *Armillaria mellea* and most butt decay to *Phlebia strigozonata*; in *P. balsamifera* both were caused by *Pholiota spectabilis*. Total losses due to decay in *Populus tremuloides* were 25% and in *P. balsamifera*, 10%.

Huni (M. C.). **Culture de la pholiote du Peuplier (Pholiota aegerita).** [Cultivation of the Poplar *Pholiota* (*P. aegerita*).]—*C. R. Acad. Agric. Fr.*, **46**, 2, pp. 77–81, 1960.

Reference is made to the field cultivation of this agaric [cf. **33**, 568] by methods known from ancient times. The author was able to grow it [cf. Oddoux, **35**, 69] on wood chips of false acacia [*Robinia pseudoacacia*], chestnut, lime [*Tilia vulgaris*], oak (acorns also), hazel [*Corylus avellana*], birch, and poplar in water in Erlenmeyer flasks, but only after autoclaving. Fruiting bodies were regularly and rapidly obtained on horse manure after it had undergone autofermentation and further fermentation by the addition of $(NH_4)_2SO_4$ (5 doses, at intervals of 6–7 days). This fermented manure was leached, dried, and placed in covered vessels before inoculation.

Hasimoto (H.). **Spot anthracnose of Wax Trees.**—*J. Jap. For. Soc.*, **41**, 6, pp. 239–242, illus., 1959. [*Biol. Abstr.*, **35**, 13, p. 3169, 1960.]

Symptoms and the morphology of *Sphaceloma rhois* causing spot anthracnose of *Rhus succedanea* are described. Extraction tests showed that the quality and quantity of wax are seriously affected.

Kristensen (H. R.). **Report to the Government of India on the Sandal spike disease.** —*F.A.O.* (*E.T.A.P.*) *Rep.* 1229, 31 pp., 5 fig., 1960. [58 ref. Cyclostyled.]

Following an historical survey of the disease [see below] this report describes the external symptoms and gives an account of histological, chemical, and physiological changes in affected plants.

Iyengar (A. V. V.). **Spike disease of plants.**—*Indian For.*, **86**, 8, pp. 489–496, 1960.

This further work from Malleswaram, Bangalore, reports that besides sandal [**39**, 632] 37 other plant spp., including *Cassia fistula*, have been observed to be spiked in the forest areas in S. India. All of them could be grouped together under the name of spike, which would include rosette, mosaic, and yellows, on both a morphological and a physiological basis. The main disturbance appears to lie in the defective lime (Ca) supply from the roots to the aerial organs. The increased starch content in affected leaves and twigs is not due to a lack or diminution of amylase action in them. The Ca/N ratio is a very satisfactory index of the disease in any tissue, being very low in the leaves and twigs and very high in the roots of diseased plants.

Parmeter (J. R.), Bega (R. V.), & Hood (J. R.). **Epidemic leaf-blighting of Californian-Laurel.**—*Plant Dis. Reptr*, **44**, 8, pp. 669–671, 3 fig., 1960.

During the winter 1957–8 *Umbellularia californica* trees in the central coastal region of Calif. were severely affected by leaf blight, associated with *Pseudomonas lauracearum* [**31**, 262], *Kabatiella phoradendri* f. *umbellulariae* [**31**, 38], and *Colletotrichum gloeosporioides* [*Glomerella cingulata*]. The following summer *Botryosphaeria* sp. caused a branch die-back. Unusually wet winters in 1955–6 and 1957–8 are thought to have caused the epidemic.

KELMAN (A.), HODGES (C. S.), & GARRISS (H. R.). **Needle blight of Redcedar, Juniperus virginiana L.**—*Plant Dis. Reptr*, **44**, 7, pp. 527–531, 1 fig., 1960.

The blight, frequent in N. and S. Carol. and Va, causes the needles to turn ash-brown, defoliation of lower branches, and abnormal development of juvenile needles on larger affected branches. Sporodochia of *Exosporium glomerulosum* were found on the leaves. Opt. temp. for formation and germination of conidia was 20° C. In a Christmas tree plantation the disease was controlled by applications of ortho phaltan (2 lb./100 gal.) at 10-day intervals and after each heavy rainfall.

TSERLING (G. I.). Микоризообразование у Лиственницы в условиях черноземных почв Заволжья и приёмы его стимулирования. [Mycorrhiza formation in Larch under the conditions of Transvolga chernozem soils and modes of its stimulation.]—*Microbiology, Moscow*, **29**, 3, pp. 401–407, 4 fig., 1960. [Engl. summ.]

Further studies from the Kuĭbyshev agric. Inst. [cf. **38**, 167] showed that mycorrhizal formation in larch seedlings can occur naturally in the acid chernozem soils of the Transvolga at pH 5·4–5·8. In nurseries the absence during the 1st yr. of large-scale mycorrhizal development, with both natural and artificial infection, results in low and very variable yield. When larch is planted for the first time, the addition of soil containing mycorrhizal inoculum is essential, and on carbonate chernozems measures are needed to increase acidity and improve irrigation. No further inoculum is required with subsequent plantings. Repeated cultivation of larch on the same nursery plots should ensure 100% mycorrhiza in 1 yr. seedlings, a 10–11·5-fold increase in yield, and a 2–2·5-fold increase in height.

JEWELL (F. F.). **New Pine hosts for southern fusiform rust.**—*Plant Dis. Reptr*, **44**, 8, p. 673, 1960.

A note on 6 new pine hosts for *Cronartium fusiforme* [**39**, 445].

SHAW (C. G.) & LEAPHART (C. D.). **Two serious foliage diseases of Western White Pine in the Inland Empire.**—*Plant Dis. Reptr*, **44**, 8, pp. 655–659, 6 fig., 1960.

Two distinct diseases, not previously differentiated, are involved in foliage discoloration and crown deterioration of *Pinus monticola* in northern Idaho. Needle cast, associated with the upper crown, shows first as a tan brown to reddish discoloration of the previous year's needles, which turn brown and fall during the autumn; in severe infections only the current season's needles remain. All the discoloured needles are infected by *Hypodermella arcuata* [cf. **12**, 254; **39**, 58].

Needle blight [cf. below] is prevalent in the lower crowns, a reddish brown colour first apparent at the tips of the previous season's needles extending during the winter. Needles of the year before that are discoloured along their entire length are retained. After the 3rd year the needles may be shed or, if remaining, they turn bleached grey. Needle blight is caused by *Lecanosticta* sp. similar to *L. acicola* (*Scirrhia acicola*) [cf. **20**, 186; **38**, 721] and is most common in pole size and younger stands, though the disease is also found in mature stands.

LINZON (S. N.). **Comparative studies of growth in healthy and needle-blighted White Pine saplings.**—*Bi-m. Progr. Rep., Div. For. Biol., Dep. Agric. Can.*, **16**, 4, pp. 1–2, 2 graphs, 1960.

Observations of groups of healthy and needle-blighted saplings of eastern white pine [*Pinus strobus*: **39**, 749] about 15 yr. old showed that the disease causes reduction in leaf and twig size, a decrease in height and diam. increments, and the production of fewer buds on shoots.

RIFFLE (J. W.) & STRONG (F. C.). **Studies in White Pine seedling root rot.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **42**, 4, pp. 845–853, 1 fig., 1960.

In isolations from 1,832 diseased white pine [*Pinus strobus*] seedlings from the

Chittenden U.S. For. Serv. Nursery, Wellston, Mich., *Fusarium* spp. predominated (30·8%) [cf. **32**, 327; **38**, 547], followed by *Penicillium* (8·41%), *Trichoderma* and *Rhizopus* (6·6%), and bacteria (4%). Symptoms were chlorosis, stunting, drying of the needles, and death. Soil inoculation with *Fusarium* isolates resulted in disease of seedlings, and *F.* spp. preponderated in reisolations, *F. oxysporum* proving the most pathogenic inoculum.

ROWAN (S. J.). **The susceptibility of twenty-three tree species to black root rot.**—*Plant Dis. Reptr*, **44**, 8, pp. 646–647, 1960.

In greenhouse tests at the U.S. Dept Agric., Macon, Ga, on 22 coniferous spp., the results of which are tabulated, 11 *Pinus* spp. were rated susceptible to black root rot (caused by *Sclerotium bataticola* [*Macrophomina phaseoli*] and *Fusarium* spp.) [cf. **33**, 1]. *P. glabra* was highly resistant and *Cupressus arizonica*, *Taxodium distichum*, *Chamaecyparis thyoides*, and *Liquidambar styraciflua* were immune.

DADANT (M. R.). **Une méthode d'évaluation des sensibilités des espèces ligneuses au pourridié provoqué par le 'Clitocybe tabescens'.** [A method for estimating the susceptibility of woody species to rot caused by *C. tabescens*.]—*C.R. Acad. Agric. Fr.*, **46**, 2, pp. 74–77, 1960.

The growth (dry wt.) of the fungus [cf. **37**, 408] on media prepared from fresh, healthy bark from young roots of *Leucaena glauca*, *Albizzia lebbeck*, *A. stipulata* (all 3 highly susceptible), *Terminalia perieri* (not very susceptible), and *Inga dulcis* (the least susceptible) was in direct relation to the susceptibility of the host.

The medium was prepared by soaking bark and sapwood shavings in water at room temp. (30° C.) for 24 hr., autoclaving (30 min. at 1 kg.), roughly sieving (1 mm. mesh), and then autoclaving the filtrate again. The inoculum was floated and the fungal growth harvested after 1 month at 30°. These results suggest that potential shade and crop plants, etc. might be tested *in vitro* for susceptibility to potential local pathogens without recourse to lengthy field trials.

CAMPBELL (R. N.). **Some sap-stain fungi found in Minnesota.**—*Plant Dis. Reptr*, **44**, 8, pp. 625–628, 1960. [21 ref.]

Of 7 *Ceratocystis* spp. isolated from sapwood of logs, lumber, or stumps of native trees in Minn., 6 are new records for the State; some new host records are also detailed.

[MATHIESEN-]KÄÄRIK (AINO). **Growth and sporulation of Ophiostoma and some other blueing fungi on synthetic media.**—*Symb. bot. Upsaliens.*, **16**, 3, 168 pp., 21 graphs, 1960. [242 ref.]

At the For. Res. Inst., Stockholm, 18 *Ophiostoma* spp. and 6 blueing imperfect fungi grew well on 0·75–8% malt; the production of mycelial conidia was good at 0·1–8% while graphia and other sporophores were produced only at 0·25–7%. In liquid media only mycelial conidia were produced. Perithecia were usually produced at 0·25–5% malt. Nearly all the spp. required 1 or more of the vitamins thiamine, pyridoxine, and biotin, but *O. brunneo-ciliatum* and *O. stenoceras* were vitamin-autotrophic. Added vitamins had very variable effects on the production of conidia, the greatest numbers of which were produced when mycelial growth was partially inhibited by the absence of some necessary vitamins. *Scopularia phycomyces* alone was stimulated by the addition of casein hydrolysate to a medium already containing thiamine, pyridoxine, and biotin. The 5 str. of *O.* [*Ceratocystis*] *ulmi* used were variable in their vitamin requirements, some being pyridoxine-deficient while others also required B_1. All 5 strs. of *O.* [*C.*] *piceae* were pyridoxine-heterotrophic. All the biotin-deficient blueing fungi were stimulated by aspartic acid, oleic acid, and tween 80, but not as much as by biotin.

Glucose, fructose, mannose, and frequently galactose were good C sources. Pentoses were sometimes superior to hexoses; maltose and cellobiose were also good, as was pectin.

Asparagine, glutamine, and alanine were all good N sources. Nutrient media with high N contents were unsuitable for the production of coremia and perithecia, the best production of graphia and perithecia being obtained at the lowest N concs. (0–0·4% and 0–0·05% N, respectively) but with higher glucose levels perithecia were produced even at high N concs.

Graphia and other sporophores were produced under similar conditions to those required for perithecia, but their optimum requirements were usually for C and N compounds other than those favouring perithecia or mycelial conidia.

Mathiesen-Kääarik (Aino). **Studies on the ecology, taxonomy, and physiology of Swedish insect-associated blue stain fungi, especially the genus Ceratocystis.**—*Oikos*, **11**, 1, pp. 1–25, 1960. [71 ref.]

A summary of a series of studies at the Mycol. Lab., For. Res. Inst., Stockholm, Sweden, previously published separately (*Oikos*, **2**, 2, 275–308, 1950) [**31**, 42; **33**, 394; and above].

Ważny (J.). **Badania nad wartością pH grzybni niektórych grzybów niszczących drewno.** [Investigations on the pH values of the mycelium of some wood-destroying fungi.]—*Acta Soc. Bot. Polon.*, **29**, 2, pp. 315–330, 4 graphs, 1960. [Engl. summ.]

At Inst. Wood Pathol., Conservation High Sch. Agric., colorimetric pH analyses gave a range of data for 20 spp., which were further modified by the composition of the nutrient, the conc. of fungicides, and other factors. The pH value of the mycelium, usually higher than that of the medium, increased when glucose and NaF concs. of the medium were increased and fruit bodies were formed, and decreased with increasing temp. and culture age; the pH of fruit bodies was considerably higher than that of the mycelium.

Rudman (P.) & Da Costa (E. W. B.). **The causes of natural durability in timber. II. The role of toxic extractives in the resistance of silvertop Ash (Eucalyptus sieberiana F. Muell.) to decay.**—*Tech. Pap. Div. For. Prod., C.S.I.R.O., Melbourne*, 1, 8 pp., 1958. [Received Aug. 1960.]

III. Some conspicuous phenolic components in the heartwood of Eucalypts and their relationship to decay resistance.—*Holzforschung*, **13**, 4, pp. 112–115, 1959.

In further studies at Melbourne extracts [cf. **39**, 61] from *E. sieberiana* were incorporated in non-durable sawdust which was then tested for decay resistance and, as before, only the methanol extract was consistently toxic to the 4 test fungi [loc. cit.].

Gallic and ellagic acids were isolated from 13 *Eucalyptus* spp. but were not toxic to *Coniophora cerebella* [*C. puteana*] at levels at which they occur in *E. microcorys*, nor were 2 polyphenols, found in some of the spp., sufficiently toxic to contribute seriously to decay resistance.

Roff (J. W.) & Shen (H.). **Decay resistance of wood treated with copper naphthenate.**—*For. Prod. J.*, **9**, 8, pp. 262–265, 1 fig., 6 graphs, 1959.

A strength test to indicate the advance of decay in wood, examined at the Forest Products Lab., Vancouver, recorded at weekly intervals marked increases in the rate of deflection in small beams exposed to fungi and subjected *in situ* to an intermittent load of fixed value. A small continuing increase in deflection was noted in uninfected material loaded similarly but much less than that in partly decayed specimens. The strength loss method can be used in toxicity tests of wood

preservatives applied without pressure, and it is also more sensitive to early decay in wood than that involving the measure of wt. loss.

Results obtained in these tests, using western white pine heartwood dipped in solutions of Cu naphthenate [**38**, 376], indicated that a high conc. was required to inhibit certain fungi associated with decay in boats. *Lenzites trabea* was inhibited at the 3% level (by wt. of Cu metal) with a retention of 0·002 lb. Cu/sq. ft., followed in order of tolerance by *L. saepiaria*, *Fomes roseus*, *Poria xantha*, and *P. incrassata*, inhibited at 5% (0·004 lb./sq. ft.). A retention of 0·009 lb./sq. ft. was required to inhibit decay by *P. monticola*.

Lane (P. H.) & Scheffer (T. C.). **Water sprays protect hardwood logs.**—*For. Prod. J.*, **10**, 6, pp. 277–282, 3 fig., 2 graphs, 1960.

At the Wausau Res. Center, Lake States For. Exp. Sta., Wis., winter-cut logs of birch (*Betula alleghaniensis*, *B. papyrifera*) and maple (*Acer saccharum*, *A. saccharinum*), deck-stored under water sprays from Apr.–early Oct., remained free from unidentified decay and fungus stain, while unsprayed logs developed 21–42 in. stain and 7–10 in. of rot at the ends [cf. **39**, 254]; (Isaacson, *Wood & Wood Prod.*, **63**, 1, pp. 25–26, 60–62, 1958). Spraying should start by mid-May at the latest.

Stabnikov (V. N.). **New methods of wood preservation.**—*Derevoobrabatyvayuschaya Prom.*, **8**, 10, pp. 7–8, 1959. [*Chem. Abstr.*, **54**, 10, col. 10213 b, 1960.]

Samples 2×2×30 cm. and 10×20×110 cm. were immersed for 2 hr. at 80° C. in a 2–4% solution of H_2SO_4 or 10% AcOH, washed, dried to 20–30% moisture content, and impregnated for 1 hr. at 8 atm. pressure with anthracene oil. The hydrolysed samples absorbed twice as much preservative as did the untreated and the strength of the wood was not reduced. Samples 2×2×6 cm. with 20% moisture content, immersed for 30 min. in NaF solution or for 60 in anthracene oil and subjected to ultrasonic waves (20–400 kc./sec., 250 w. power output), possessed increased capacity for chemical absorption.

When samples naturally and artificially infected by *Coniophora cerebella* [*C. puteana*: see below] were exposed to γ-radiation from Co^{61} the fungus was destroyed by 500–750 r. in the inoculated and by 1,000–1,500 r. in naturally infected material. In wood flooring it was killed by 30 min. treatment with chloropicrin at 30 g./cu. m.

Sokolova (Mme T. E.) & Timofeeva (Mme O. G.). **Biological protection of wood-chip panels.**—*Stroit. Mater.*, **5**, 10, pp. 35–36, 1959. [*Chem. Abstr.*, **54**, 10, col. 10213 d, 1960.]

Infection by *Coniophora cerebella* [*C. puteana*: see above] of panels made by hot pressure of wood chips with a resin is stated to be completely preventable by the addition to the mixture of NaF or Na_2SiF_6 at 0·5–1% of the weight of the chips. The same degree of protection may also be obtained by the addition of 2% Na oxydiphenolate or 0·5% anthracene oil.

McNeel (W.), Shenefelt (R. D.), Pascoe (T. A.), & Scheffer (T. C.). **Effects of a decay producing organism, Peniophora gigantea (Fr.) Massee, on quality of pulp from Jack Pine.**—*Tappi*, **43**, 4, pp. 323–329, 2 fig., 11 graphs, 1960.

During a study on the losses of timber caused by insects in central Wis., the direct measurement of which presented great difficulty, it was observed that the amounts of pulpwood decay in *Pinus banksiana*, caused almost entirely by *Peniophora gigantea* [cf. **38**, 713; **39**, 131], and of [unspecified] blue stain were considerably less where insects were controlled. Increases in decay by the fungus were shown to be responsible for significant reductions in burst, tear, tensile strength, caliper, opacity, and probably folding endurance of pulp after storage periods of up to 26 months.

NIKAI (S.). **Causes and prevention of mildew on Bamboo wares. VII. Fungistatic effects of sodium dehydroacetate and sodium sorbate.**—*Hakkô Kogaku Zasshi*, **37**, pp. 10–23, 1959. [*Chem. Abstr.*, **54**, 12, col. 12457 i, 1960.]

NIKAI (S.), KANDO (S.), & ITAKURA (M.). **IX. Chemical components of Bamboo, Phyllostachys edulis, and the growth of molds on its extracts. X. Fungistatic effects of several inorganic compounds. XI. Fungistatic effects of organic mercurials.**—*Ibid.*, **37**, pp. 281–384, 1959. [*Chem. Abstr.*, **54**, 15, col. 15803 e, 1960.]

At Shimane Industrial Exp. Sta., Matsue, Japan, complete permeation of the bamboo stem by Na dehydroacetate was attained, irrespective of conc., and the development of mildew [**39**, 640] was prevented, but it operated more rapidly from the transverse than from the tangential surfaces. At pH 3–3·8 it exerted a powerful toxic action on *Aspergillus niger*, *Penicillium citrinum*, and other destroyers of bamboo, while Na sorbate was active only at pH 3.

The amino acid and sugar contents of *P. edulis* are listed; they are considered to provide suitable nutrients for various moulds. CuSiF inhibited spore germination in suspensions sprayed over the plants at 1:200 and on hot water-extracted bamboo at 1:400. SbF_3.NaF and SbF_2.NH_4F were fungistatic at 1:200 and 15:1,000 on spore-inoculated and spore-sprayed plants, respectively. In koji agar ethylmercuric phosphate (EMP) exerted a stronger antifungal action than any of the other organic Hg compounds tested on *A. niger*, *Cladosporium herbarum*, *Pullularia pullulans* (the most resistant), *Alternaria tenuis*, and *Penicillium citrinum*. On bamboo stems inoculated with conidia of these spp. growth was inhibited by EMP at 1:100,000 compared with 1:40,000 for phenylmercuric dinaphthylmethanedisulphonate and methoxyethylene HgCl. Spontaneous mould infection was prevented by treatment of the stems with the 1st- or last-named chemicals.

ARNOLD (W. N.) & BALD (J. G.). **Turnip mosaic virus from two weed hosts.**—*Phytopathology*, **50**, 8 (1), pp. 578–581, 1 graph, 1960.

At Univ. Calif., Los Angeles, the host ranges of virus isolates from black and yellow mustard, inoculated to 10 spp. of Cruciferae, 4 Solanaceae, and 2 Chenopodiaceae, agreed closely with those of 2 strs. of turnip mosaic virus, viz. mild stock mosaic virus [**18**, 459] and *Brassica nigra* virus [**33**, 398]. Inconsistencies in the reaction of Turkish tobacco were attributable to differences in age or condition of the inoculated leaves. Some turnip plants from commercial Purple Top Globe seed developed a local necrosis instead of systemic symptoms, this apparently being due to variation between the plants and not in the virus.

As an alternative to the local lesion assay method for which no good host was available, seedlings of mustard and turnip were systemically infected in the cotyledon stage with various dilutions of the virus. Mustard proved the more sensitive. This 'whole plant' method saved time and greenhouse space and may have a wider application.

HULL (R.). **Sugar Beet diseases.**—*Bull. Minist. Agric., Lond.*, 142, v+55 pp., 20 pl. (8 col.), 2 diag., 1960. 7*s.* 6*d.*

In this revised edition [cf. **29**, 240] the information gained from extensive research work during the past 10 yr. has been incorporated. Important additions have been made to the sect. on beet yellows virus and its control (pp. 10–16) and the problems of nutritional diseases are fully discussed (pp. 20–28). New information has also been added on the control of seedling leaf and vascular diseases, injuries due to weather, to chemicals, and insects, genetical abnormalities, and root diseases.

RUSSELL (G. E.). **Breeding for resistance to Sugar Beet yellows.**—*Brit. Sug. Beet Rev.*, **28**, 4, pp. 163–170, 5 fig., 1960.

The work carried out at the Plant Breeding Inst., Cambridge, since 1953 [cf. **39**,

563], is reviewed. It has recently been found that 2 viruses may be involved in the yellows complex, sugar beet yellows virus (SBYV) and sugar beet mild yellows virus (SBMYV) [**38**, 170]. There are apparently many different strs. of SBYV, but it is thought that tolerance of any one of them is usually associated with tolerance of most others. Less is known about SBMYV, but there are probably a number of strs. Of 100,000 seedlings of sugar beet and other *Beta* spp. tested, none proved of any great value as a source of any kind of resistance to yellows. In glasshouse tests for tolerance of SBYV [**36**, 367] seedlings showing only mild symptoms were chosen for seed production and selection was further improved by washing and weighing the roots of the young infected plants 8 weeks after inoculation and selecting only those with large roots. Those selected were induced to flower rapidly by a vernalization treatment and then selfed or crossed to obtain more tolerant lines.

Sadÿbekov (A. S.). Биологический метод борьбы с корнеедом Сахарной Свеклы. [A biological method of control of black leg of Sugar Beet.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], biol. Sci., *1960*, 3, pp. 179–183, 1960.

Work was undertaken to obtain fungi antagonistic to *Rhizoctonia* [*Moniliopsis*] *aderholdii* [cf. **34**, 763], the causal agent of black leg of sugar beet in Kazakhstan. Of 696 actinomycete strs. isolated from samples of different Kazakhstan soils, 35% were found to be antagonistic. Seed treatment with the crude liquid of these had a definite effect on seed germination, sprout infection, and seedling condition; some strs. stimulated germination and imparted resistance to *M. aderholdii*, while others were toxic and did not protect the shoots. Eight strs. afforded resistance, 5 of these stimulated growth, and 3 were toxic to shoots. Pre-sowing seed treatment with culture liquid reduced infected shoots from 36·3% in the untreated to 1·5–32·1%. Intensive propagation of such antagonistic actinomycetes in the soil inhibited the development and activity of *M. aderholdii* and preserved plants from infection. Composts containing actinomycetes are more effective when introduced into the soil under sterile conditions.

Kocková-Kratochvílová (Anna) & Valošková-Kotulová (Amálie). **Výskyt aktívnej giberely na Slovensku.** [Occurrence of an active *Gibberella* in Slovakia.] —*Čes. Mykol.*, **14**, 3, pp. 185–187, 1960. [Germ. summ.]

A report from Chem. Inst., Slovak Acad. Sci., Bratislava, Czechoslovakia, on the occurrence of *G. fujikuroi* var. *subglutinans* [map 191], which was isolated from beet in Pohronský Ruskov. The str. produced gibberellic acid.

Spire (D.). **Influence des conditions de milieu sur le développement de la maladie des taches jaunes du Cresson (Nasturtium officinale R. Br.).** [The effect of environmental conditions on the development of yellow spot disease of Watercress.]—*C.R. Acad. Agric. Fr.*, **46**, 8, pp. 505–507, 1960.

Watercress mosaic virus [cf. **37**, 1] has recently become widespread N. of the Loire, particularly near Paris. In warm weather the symptoms disappear and the new leaves appear to be healthy. Therefore for cultivation in frames in winter affected beds are covered with plastic sheeting, which raises the temp. of the bed and so induces masking. The symptoms disappear after 10 days or, if the disease has only recently developed, in even less time.

Till (B. B.) & Hooper (L. J.). **Disease control in Watercress.**—Abs. in *Trans. Brit. mycol. Soc.*, **43**, 2, pp. 460–461, 1960.

The principal diseases are one caused by a virus [cf. above], possibly a str. of cabbage black ring spot, and now largely eliminated by seed propagation, and crook root

(*Spongospora subterranea* f.sp. *nasturtii*) [**40**, 5]. In preliminary trials some control of crook root was achieved with Na hypochlorite (opt. 0·1–0·2 p.p.m. Cl) dripped into the source water. This treatment is not yet recommended for commercial use as the effect of the treated water on fish has yet to be determined.

Heim (Panca). **Évolution du Spongospora, parasite des racines du Cresson.** [The development of the *S.* parasite of Watercress roots.]—*Rev. Mycol., Paris*, **25**, 1, pp. 3–12, 1 pl., 1960. [18 ref.]

A more detailed version of the cytology of *S. subterranea* f.sp. *nasturtii* [**38**, 637].

Buxton (E. W.), Doling (D. A.), & Reynolds (J. D.). **Additional Pea varieties and new selections resistant to Fusarium wilt.** —*Plant Path.*, **9**, 2, pp. 54–56, 1 pl., 1960.

In further tests on land infested by *F. oxysporum* f. *pisi* [cf. **39**, 66] 23 pea vars., of 35 tested, were resistant, 4 susceptible, and 8 very susceptible. Among peas grown from seed of 53 apparently healthy plants of 22 vars. susceptible the previous yr., 49% remained resistant and only 3 of the vars. were apparently not true to type.

De Tempe (J.). **Report to the Government of Israel on the Ascochyta diseases of Peas and Vetches.** —*F.A.O. (E.T.A.P.) Rep.* 1228, 15 pp., 1959. [Cyclostyled. Received Aug. 1960.]

During a 2-month investigation it was observed that *Mycosphaerella pinodes* was the primary pathogen of peas, while the less virulent *A. pisi* was of secondary importance. Vetches were infected only by *A. viciae* [**36**, 530]. Seed transmission is of minor importance for *M. pinodes* but the main means for *A. viciae*. Further work is required on transmission, varietal resistance, and control of these diseases.

Guzman (E. M.) & Richardson (R. W.). **Control de la pudrición de la semilla y raíz del Chícharo en el Valle de Toluca.** [Control of seed and root rot of Peas in the Toluca Valley.] —*Agric. Técnica Méx.*, **1**, 2, pp. 35–36, 1955. [*Biol. Abstr.*, **35**, 13, p. 3178, 1960.]

The Oficina Estud. Especiales, S.A.G., Mexico, reports that peas are very susceptible to [unspecified] seed and root rot in the summer in the Toluca Valley. When the seed of 9 pea vars. was treated with 6 fungicides, the decreasing order of effectiveness was orthocide, arasan, granosan, phygon, spergon, and semesan jr. Descending order of resistance of the vars. was Alaska, Premium Gem, Pride, World's Record, Climax, Yukon, Shasta, Pedigree, Extra Early, and Multifold.

McLean (D. M.). **A top necrosis virus of Beans from Cantaloupe plants in the Rio Grande Valley.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 576, 1960.

A virus causing 30–50% loss of Blue Lake beans [*Phaseolus vulgaris*] near Rio Grande City, Texas, induced vein clearing, with mild to severe, coarse mottling in some leaves, necrosis, leaf fall, stunting, and death. Volunteer cantaloupe melons left from a previous crop which had shown mild 'mosaic' and 'crown blight' symptoms [cf. **37**, 198] were growing among the beans. Virus isolates from bean and melon caused similar symptoms on a number of test plants and are believed to represent a str. of tobacco ringspot virus, mechanically transmissible and masked in melon at a high temp. No vector from cantaloupe to bean is known.

Agnihothrudu (V.). **Fungi isolated from rhizosphere—V.**—*J. Madras Univ.*, Sect. B, **29**, 3, pp. 155–181, 69 fig., 1959. [Received Sept. 1960.]

Descriptions of 50 imperfect fungi, excluding penicillia, isolated from the rhizosphere of pigeon pea in further studies at the Univ. Bot. Lab., Madras, India [cf. **38**, 289].

Wyllie (T. D.) & Taylor (D. P.). **Phytophthora root rot of Soybeans as affected by soil temperature and Meloidogyne hapla.**—*Plant Dis. Reptr*, **44**, 7, pp. 543–545, 4 graphs, 1960.

In greenhouse experiments at Dept Plant Path., Minn. Univ., St. Paul, symptoms on Harosoy soybeans (reduction in height and dry wt. and post-emergence death) inoculated with *P.* [*megasperma* var.] *sojae* [**39**, 523] in combination with *M. hapla* were more severe than with either pathogen alone. *P.m.* var. *sojae* was the primary cause of damage. Injury by both organisms was greatest at soil temps. above 20° C.

Clinton (P. K. S.). **Seed-bed pathogens of Groundnuts in the Sudan, and an attempt at control with an artificial testa.**—*Emp. J. exp. Agric.*, **28**, 111, pp. 211–222, 1960.

Up to 75% of groundnut seed sown at the Sudan Central Rainlands Res. Sta. is liable to destruction before emergence [cf. **33**, 65], principally by *Rhizopus* spp., active in the destruction of ungerminated seed, *Aspergillus niger*, and *A. flavus*. Both *A.* spp. mostly attack germinated seed, while *A. niger* also causes a crown rot after emergence.

Damage to the seed coat or cotyledon was found to increase the liability to attack by these fungi. Application of an artificial seed coat of methyl cellulose led to a decrease in emergence, the reason for which is not yet clear. Of 296 normal seeds (including some treated with thiram), 141 failed to germinate: of the ungerminated infected ones 111 were infected by *Rhizopus* alone, and 15 by *Rhizopus*+*A. flavus*: of those infected ones which germinated 72 were infected by *Rhizopus* alone, 22 by *A. flavus* alone, 13 by the 2 together, and 3 by other [unspecified] fungal complexes. Of 294 coated seeds (including some treated with thiram), 183 failed to germinate: of the ungerminated infected ones 159 were infected by *Rhizopus* alone, and 18 by *Rhizopus*+*A. flavus*: of the infected ones which germinated 51 were infected by *Rhizopus* alone, 5 by *A. flavus* alone, and 11 by both. Comparable figures are also given for thiram treated and untreated control seed. It seems that an artificial coat reduces the incidence of *A. flavus* but is without effect on *Rhizopus* infection.

Luttrell (E. S.) & Boyle (L. W.). **Leaf spot of Peanut in Georgia caused by Leptosphaerulina arachidicola.**—*Plant Dis. Reptr*, **44**, 8, pp. 609–611, 1 fig., 1960.

L. arachidicola, previously found only in Formosa [**37**, 438], has been isolated from groundnut leaves in 6 counties in Ga in 1958 and 1959, but has probably long been present, masked by the *Cercospora* [*Mycosphaerella*] leaf spots. In experimental leaf inoculations at the Ga Exp. Sta. the fungus produced symptoms ranging in severity from a fleck to a scorch.

McLean (D. M.). **The apothecial stage of Botrytis squamosa, cause of tip and leaf blight of Onions.**—*Plant Dis. Reptr*, **44**, 7, pp. 585–586, 1960.

At the U.S. Dept Agric., Weslaco, Texas, sclerotia of *B. squamosa* [**35**, 66] on 2% water agar, kept at 72° F. in daylight for 8–10 weeks, produced apothecia which are referred to *Sclerotinia squamosa* [cf. **33**, 200; Dennis, **35**, 848].

Duffus (J. E.). **Two viruses that induce symptoms typical of 'June yellows' in Lettuce.**—*Plant Dis. Reptr*, **44**, 6, pp. 406–408, 1 fig., 1960.

Mature lettuce in the Salinas Valley, Calif., frequently exhibits a general yellowing termed 'June yellows'. Two aphid-transmitted viruses, *Malva* yellows [**39**, 761] and radish yellows [**39**, 753], were isolated from affected plants; these both induced interveinal yellowing on several lettuce vars. Many weeds and other commercial crop plants in the area are susceptible to one or both viruses.

Murakishi (H. H.) & Honma (S.). **A strain of Tobacco mosaic virus associated with a wilt and stem necrosis of mature, field-grown Bell Pepper.**—*Plant Dis. Reptr*, **44**, 7, pp. 550–551, 1 fig., 1960.

Capsicum annuum plants at the Horticulture Farm, E. Lansing, Mich., were found to be infected by a str. of tobacco mosaic virus [cf. **39**, 366], uncommon in mature, field-grown plants. The symptoms were reproduced in the greenhouse on inoculated Penn Wonder×Allbig and Sunnybrook plants.

Sowell (G.). **Bacterial spot resistance of introduced Peppers.**—*Plant Dis. Reptr*, **44**, 7, pp. 587–590, 1960.

Greenhouse and field tests at the Regional Plant Introduction Sta., Experiment, Ga, demonstrated that 15 lines of *Capsicum frutescens* possessed sufficient resistance to *Xanthomonas vesicatoria* [**39**, 763] for use in a breeding programme.

Dutta (S. K.), Hall (C. V.), & Heyne (E. G.). **Observations on the physiological races of Colletotrichum lagenarium. Pathogenicity of biochemical mutants of Colletotrichum lagenarium.**—*Bot. Gaz.*, **121**, 3, pp. 163–166; pp. 166–170, 1960.

The 1st paper records that the differential hosts recommended by Goode [**37**, 437, 624], while permitting the identification of races of *C. lagenarium* at the Dept Agronomy, Kans. agric. Exp. Sta., Manhattan, did not give the reported disease reactions [cf. **39**, 764]. The Chris Cross watermelon offered promise as an additional differential host. When 5 isolates were studied, with Black Diamond, Charleston Gray, and Chris Cross watermelons, and Model and PI 163213 cucumber vars. as differential hosts, 4 races were identified: race 4 is described for the first time. Study of the progenies of crosses involving watermelon vars. either resistant or susceptible to race 3 confirmed that resistance is determined by a single dominant gene. No watermelon var. was resistant to race 2.

Biochemical mutants of a monosporic isolate of race 2 obtained by UV treatment included some requiring glycine or methionine which were virulent on Black Diamond and Charleston Gray and on H.B. 36 muskmelon, while a mutant requiring pyridoxine was moderately virulent on Black Diamond and H.B.36, but avirulent on Charleston Gray. Most avirulent mutants became pathogenic, giving anthracnose symptoms in 7–10 days, when the respective supplements were applied in aqueous solution to the surface of leaves of inoculated Black Diamond seedlings. Extracts from a cucumber variety supported the growth of a proline-requiring mutant, those from Charleston Gray supported an inositol-requiring mutant, and those from Black Diamond activated several biochemical mutants. In general, mutants grew better on extracts from whole tissue than from epidermal tissue, as did non-deficient isolates representing the four races.

Inhibition in the epidermal cells is suggested as a possible mechanism for resistance to natural isolates of *C. lagenarium*.

Strider (D. L.) & Winstead (N. N.). **Effect of temperature, pH, and various nutrients on growth of Cladosporium cucumerinum.**—*Phytopathology*, **50**, 8 (1), pp. 583–587, 3 graphs, 1960.

This information from N. Carol. State Coll. on the cucumber scab fungus has been noticed [**39**, 764].

Jennings (D. L.). **Observations on virus diseases of Cassava in resistant and susceptible varieties. II. Brown streak disease.**—*Emp. J. exp. Agric.*, **28**, 111, pp. 261–270, 5 graphs, 1960.

It had previously been thought that low temps. were inimical to the survival of plants infected by brown streak virus [**29**, 399; **38**, 647, *et passim*], but when the E. African Agric. and Forestry Organization grew diseased materials at high altitudes

[cf. **36**, 747] in Tanganyika low temp. did not induce lethal symptoms. Furthermore, in trials at Mlingano and Kizugu (600 ft.) in the coastal region the temp., while important, was not always the main factor controlling the intensity of the symptoms recorded.

An account is given of some variations in the form of brown streak disease occurring in [unspecified] resistant and susceptible vars. under test in field resistance trials. Resistant vars. tended to remain symptom-free. When symptoms did occur they were usually mild, frequently restricted to the roots, and often transient, with recovery in the 2nd season's growth. In hybrids derived from *Manihot melanobasis* symptoms were either severe or absent. Such hybrids appeared to be some of the most resistant available, if their resistance was assessed from trials of 1 yr. duration, but their behaviour was anomalous in the 2nd season, when all the tuberous roots of infected plants might become necrotic. Plants of the susceptible vars. Msitu and 4332/2, derived from a stock which had been infected for some time, appeared to possess a greater capacity for recovery than plants derived from a clean stock. Seasonal variations in the severity of brown streak disease in 2 control varieties were positively correlated with variations in the degree of resistance shown to cassava mosaic virus.

Ciferri (R.) & Corte (A.). **Experimental transmission of Vine 'infectious degeneration' virus and its occurrence on various hosts in Italy.**—*F.A.O. Plant Prot. Bull.*, **8**, 7, pp. 79–81, 1 fig., 1960.

A summary of the authors' experiments at the Univ. Pavia [**39**, 208, 259].

Vuittenez (A.). **Mise en évidence chez les Vignes atteintes de dégénérescence infectieuse, d'une virus transmissible mécaniquement aux Chénopodes (Chenopodium amaranticolor et C. quinoa).** [Demonstration in Vines infected by infectious degeneration of a virus transmissible mechanically to the Chenopodiaceae (*C. amaranticolor* and *C. quinoa*).]—*C.R. Acad. Sci., Paris*, **251**, 5, pp. 783–785, 1960.

In further work at the Sta. de Pathologie Végétale, Colmar [**39**, 148], these hosts were inoculated with sap from infected vine leaves macerated either in a solution of nicotine [**30**, 231] or in one of $(NH_4)_2 SO_4$ adjusted to pH 7·5 [**39**, 429]. The plants were kept at 20–22° C. under artificial light (4,000 lux) for 14 hr. daily.

Most of the *C. amaranticolor* plants responded by the development of numerous minute (av. diam. $\frac{1}{3}$ mm.), sharply delimited, local lesions with a dark centre surrounded by a yellow border, the $(NH_4)_2 SO_4$ sap giving particularly heavy infection, with up to 66 spots/leaf. The subterminal leaves were the most susceptible, while those at the base remained symptom-free.

In a further series of tests very clear-cut symptoms of mosaic virus appeared on the newly formed leaves of 1 out of 4 *C. amaranticolor* inoculated with an extract from mosaic-infected vine var. Kober 5 BB, as well as on all 3 of the same host inoculated with sap from symptomless *C. quinoa* inoculated from a heavily mottled vine. Up to the present *C. quinoa*, tobacco, and *Nicotiana rustica* have not shown typical symptoms [of infectious degeneration]. On the other hand, symptoms of ring spot virus and discoloured, sinuous, parallel lines developed on several leaves of 2 out of 25 White Burley tobacco plants inoculated with sap from cherry foliage infected by Pfeffinger disease [cherry rasp leaf virus]. Reinoculation of *C. quinoa* with sap from the infected tobacco plants resulted in the production of well-marked local necroses on the subterminal leaves, followed by severe 'shock' symptoms on the newly formed ones and culminating in wilting and death. *C. quinoa* reacted in a similar manner to strs. of raspberry ring spot and *Arabis* mosaic viruses [**39**, 427].

Ochs (Gertrud). **Quantitativer Nachweis eines Abbaus von Zellulose und Lignin in der rollkranken Rebe.** [Quantitative demonstration of a decomposition of

cellulose and lignin in the leaf roll-diseased Vine.]—*Experientia*, **16**, 8, p. 361, 1960. [Engl. summ.]

Some of this information from the Botanisches Inst., Univ. Freiburg (Breisgau), Germany, on vines infected by leaf roll virus has been noticed [**39**, 767]. Analyses of severely infected plants revealed that the cellulose content had fallen to 0·3% of the normal, while the lignin had disappeared completely and the proportion of 4-methyl-D-glucuronic acid was 54·7%; in milder cases with almost symptom-free foliage the values were 22, 13, and 26·3%, respectively.

Die-back in Vines being investigated.—*J. Agric. S. Aust.*, **63**, 9, p. 416, 1960.

Die-back occurs mainly in var. Grenache and is characterized by stunting of shoots, leaf tattering, and loss of crop. The symptoms resemble those of dead arm in N.S.W. [**38**, 177], but there is no sign of a fungus nor do the control measures recommended for that disease have any effect. It is thought that a virus [cf. **36**, 454] spread by cuttings is involved, and that the only remedy is to take cuttings from healthy plants.

Taschenberg (E. F.) & Braun (A. J.). **Evaluation of phaltan for the control of Grape diseases.**—*Plant Dis. Reptr*, **44**, 7, pp. 560-565, 1 graph, 1960.

In field tests at N.Y. State agric. Exp. Sta., Geneva, phaltan [**39**, 153] at 2 lb./100 gal., 250 gal. acre for the 1st and 2nd., 30 gal. for the 3rd spray, gave effective control of *Uncinula necator*, *Guignardia bidwellii*, and *Plasmopara viticola* on Concord vines. No foliage injury was noted in 1957 and 1958, but in 1959 there was some damage, particularly under drought conditions. Four weeks after the final spray 60% by weight of the phaltan had weathered from the grapes. The residue on fresh grapes 14 days after spraying was 8·6 p.p.m. and after 49 days 2·3 p.p.m. Fruit quality was unaffected by 3 phaltan+DDT sprays.

Rafailé (K.), Savin (G.), & Petrescu (I.). Рациональная организация борьбы с Виноградной мильдью. [Rational organization of the control of Vine mildew.]—Меж. сел.-хоз. Ж. [*Mezh. sel.-khoz. Zh.*], **3**, 5, pp. 86 95, 2 fig., 3 graphs, 1959.

The authors report that excellent control of *Plasmopara viticola* [**37**, 696] in all wine-producing areas of Romania has been obtained with the aid of forecasting during the incubation period. Great effectiveness is obtained with a network of outstations supporting the main stations, which make possible individual forecasts in relation to the microzone of each growing region. There are at present 48 forecasting stations in Romania.

Henner (J.). **Unterschiedliche Peronospora-schäden im österreichischen Weinbau im Jahre 1959.** [Various levels of *Peronospora* damage to Austrian viticulture in 1959.]—*Pflanzenarzt*, **13**, 5, pp. 43–44, 1960.

Meteorological data for a number of districts in Austria used at the Bundesanstalt für Pflanzenschutz, Vienna, are tabulated. Extremely favourable conditions in May, and in June or July, at Mistelbach, Graz, and Leibnitz, led to catastrophic losses from *P.* [*Plasmopara*] *viticola*.

Henner (J.). **Sind Oidiumschäden wirklich so schwer vermeidbar?** [Is *Oidium* damage really so difficult to prevent?]—*Pflanzenarzt*, **13**, 6, p. 59, 1960.

This popular note from the Bundesanstalt für Pflanzenschutz, Vienna, emphasizes the need for preventive spraying (at least 1 or 2 applications before flowering) where the disease [*Uncinula necator*: cf. **39**, 150] was present in the previous year, and particularly when, owing to dry sunny weather, spraying against *Peronospora* [*Plasmopara viticola*] is delayed until the last possible moment before flowering.

In these circumstances the 1st preventive application against *U. necator* cannot be combined with *P. viticola* spray, and a dust preparation may prove more labour-saving.

Ochs (Gertrud). **Vergleichende Versuche über die Wirksamkeit bewährter Kupfermittel mit modernen organischen Fungiziden gegen Pseudopeziza tracheiphila Müller-Thurgau unter Berücksichtigung der Ernteergebnisse bei Weinreben.** [Comparative experiments on the efficiency of proved Cu fungicides and modern organic fungicides against *P. tracheiphila* with regard to Vine yield.]—*Schweiz. Z. Pilzk.*, **38**, 9, pp. 129–133, 1960.

At the Botanisches Inst., Univ. Freiburg (Breisgau), Germany, all of 9 Cu, 2 S-Cu, 7 organic, and 2 combined fungicides at the conc. recommended were effective in inhibiting spore germination of *P. tracheiphila* [**39**, 368]. On sprayed vines lutiram, F 40 (ferbam), cosanil (Cu-S+zineb), dithane, and fungopulvit (zineb) improved the yield qualitatively 12% and quantitatively 25% in comparison with Cu alone.

Ablakatova (Mme A. A.). Новое заболевание Винограда. [New disease of Vine.] —Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 7, p. 27, 1960.

A report by Siberian Dept, Acad. Sci. U.S.S.R., on the occurrence of *Aureobasidium vitis* [cf. **2**, 152] in Primor'e, 1st found on vars. Prima, Al'fa, Taezhnyĭ, and Izumrud, amongst others.

Pieri (G.). **Prove di lotta contro la Botrytis cinerea dell'Uva.** [Tests of the control of *B. cinerea* on Grape.]—*Ann. Sper. agr.*, N.S., **14**, 2, Suppl., pp. xi–xxii, 1960. [Engl. summ.]

In tests at the Stazione Sperimentale di Viticoltura e di Enologia, Conegliano, Italy, in 1957–8, satisfactory control of *B. cinerea* on grapes [cf. **37**, 756; **38**, 123] was given by the products S-971, T-001 (both containing ziram), and T-002 (containing a substance chemically like captan) (all supplied by Riedl de-Haen A.G., Seelze/Hannover, Germany). Of these, T-002 gave the best results. Only 1 or 2 applications appear to be required, shortly before harvest, or 1 when the grapes darken and another about 2 weeks before picking. The experiments are to be repeated on a larger scale.

Richards (B. L.), Middleton (J. T.), & Hewitt (W. B.). **Ozone stipple of Grape leaf.**—*Calif. Agric.*, **13**, 12, pp. 4, 11, 1 fig., 1959.

The primary symptoms in this condition [cf. **38**, 131] are distinguished from those of other disorders by the stippled appearance of the upper leaf surface. Brown to black, discrete, punctate lesions 0·1–0·5 mm. diam. are confined to groups of cells bounded by the smallest veins, and occur only in the palisade layer. Large lesions, up to 2 mm. diam., result from the coalescence of smaller ones. Field observations on 16 vars. showed that the stipple lesions occurred early in the growing season on relatively young but fully expanded leaves. Secondary symptoms of leaf bronzing, yellowing, premature senescence, and leaf fall are common in some vars. Premature leaf fall may lead to scalding or withering of the exposed fruits. Treatment of 16 grape vars. with 0·5 p.p.m. ozone for 3 hr. consistently produced stipple symptoms. Ozone stipple can be distinguished from oxidant injury—caused by oxidized organic compounds—by the absence of any pronounced silvering or glazing of the lower surface.

Fortieth Report of the National Institute of Agricultural Botany, Cambridge, 1959. —63 pp., 1960.

In the mycol. Sect. (pp. 23–27) [cf. **39**, 71] it is noted that as complete control of

loose smut [*Ustilago nuda*: cf. **36**, 175, 312] of wheat and barley was obtainable by a 2-bath hot water treatment, and for wheat a 1-bath treatment (4 hr. in water at 113° F.) was also effective, a 1-bath treatment for barley was tested. At 78° soaking for 36 hr. was necessary, but at 87° 20 hr. sufficed.

Infected straws from international nursery plots in Portugal, Bristol, and Cambridge yielded races 21, 40, 17, 34, and possibly 14 and 133 of black rust [*Puccinia graminis*], 21 being predominant.

The Potato Branch reports (pp. 27–32) that Pentland Crown and 3 of 6 potato seedlings from Northern Ireland were susceptible to inoculation with 9 races of blight [*Phytophthora infestans*]. Several vars. in course of multiplication were found to include an occasional plant infected with potato virus A; this virus appeared to spread more extensively in centres N. of the Wash.

Notable in the cereal trials (pp. 12–17) were Elite Lepeuple winter wheat with no loose smut: Hesbignon with no loose smut or yellow rust [*P. striiformis*]; Els spring wheat with no loose smut and better resistance to mildew [*Erysiphe graminis*] than Atle: Probat and Ring with no loose smut or yellow rust; and 5370/2/2141 winter oats with good resistance to mildew.

Seventh Annual Report, 1959–1960, Scottish Horticultural Research Institute.— 72 pp., 1 pl., 1 plan, 1960.

Under 'Virology' (pp. 48–53) [cf. **39**, 261], by C. H. Cadman, notes are presented with R. M. Lister, Ann Bulloch, & J. Cathro on the identification and properties of ring spot viruses. Diagnosis by the agar double-diffusion technique showed that specific precipitation lines usually form only with viruses in high concs. in infective sap. *Arabis* mosaic virus (in crude sap from the tip leaves of systemically infected *Chenopodium amaranticolor*) [**39**, 683] can generally be identified by this method. In another more promising method diagnosis depends on the specific abolition of infectivity which occurs when diluted infective sap is mixed with the homologous antiserum (diluted) before inoculation to test plants. Electron microscopy showed that *Arabis* mosaic, raspberry ring spot [raspberry Scottish leaf curl], and tomato black ring viruses all have isometric particles of about 250 A diam. Viruses of the ring spot type were readily transmitted mechanically to herbaceous plants from vine leaves infected by fanleaf [infectious degeneration] virus from Calif. [**38**, 237] and from leaves of vines with fanleaf and panachure [cf. **38**, 557] from Switzerland and France. The properties and relationships of these viruses are under investigation. The N. American tomato ring spot virus, the manner of spread of which is unknown, was shown to be related to peach yellow bud mosaic [**39**, 117, 722]. A soil-borne virus, associated with cherry leaf roll virus in Kent, but serologically unrelated to the ring spot group, was found to be serologically related to Eckelrade disease [cherry rasp leaf virus] from the Netherlands.

Dealing with the transmission, dissemination, and control of ring spot viruses, C. H. Cadman & W. P. Mowat record the rarity of *Arabis* mosaic virus in Scotland, and no *Xiphinema* was found in soils where apparently indigenous outbreaks occurred [cf. **39**, 427]. Further work with C. E. Taylor confirmed the view that soil-living agents are involved in the transmission of raspberry Scottish leaf curl and tomato black ring viruses [**39**, 682]. C. H. Cadman & J. Chambers found that soil treatments with DD or mercuric oxide failed to reduce soil infectivity at sites where raspberry Scottish leaf curl and tomato black ring viruses were present. Soils containing tobacco rattle virus [potato stem mottle virus str.: **39**, 610] seem to lose infectivity when stored and when air-dried at 20° C. for a week. This virus was found infecting rhubarb.

[Raspberry] bushy dwarf virus [**31**, 192], the chief cause of failure in growth and cropping of the Lloyd George raspberry in Great Britain, is associated with a virus mechanically transmissible to herbaceous hosts. An apparently identical virus is

widely present in plum and ornamental *Prunus* spp. No aphid vectors are known and the virus does not appear to be soil-borne.

In 'Mycology' (pp. 54–59), by A. R. Wilson, observations by W. R. Jarvis on grey mould (*Botrytis cinerea*) [cf. **39**, 262] of raspberries are described which made it clear that the fruit should be picked as often as possible to reduce the establishment of centres of infection, though in fact such removal is usually impracticable on a commercial scale. The rapid onset of the disease under favourable conditions leaves little time for the use of prophylactics. Chromatography showed that at least 3 sugars+citric and malic acids appear in the infection drop within 1 hr., the amounts varying with ripeness and, to a less extent, with var. Control by griseofulvin and alginates is promising but such treatment has not yet been officially approved.

A comparison of the effects of straw, polythene sheet, and uncovered ground beneath the fruit of Talisman strawberries on the incidence of grey mould showed that over both types of cover there was significantly more grey mould ($P = 00{\cdot}5$) than over uncovered ground. Treatment of strawberry chip baskets with Cu-8-quinolinolate [loc. cit.] caused tainting of the fruit: a freshly-prepared, odourless solvent should be used in baskets thoroughly dried before packing.

Further work on the effect of various polyphenols on the growth of *Phytophthora fragariae* demonstrated that within each of 3 pathogenic races there are considerable differences in the pattern of tolerance of a given set of polyphenols unrelated to pathogenicity. The polyphenols exert quite different effects on dry wt. and radial growth.

In an investigation with T. G. Rubens of a die-back of raspberry vars., particularly Malling Promise, *Cylindrocarpon radicicola* and *Pythium* sp. were isolated from lesions on young roots, and both were shown to be able to infect raspberry roots.

In the report from Auchincruive (pp. 60–65) by R. D. Reid, I[sabel] G. Montgomerie notes that differences in the behaviour of strawberry runners from the same resistant clone when inoculated with one isolate of *Phytophthora fragariae* render any permanent classification of physiologic races virtually impossible, but the vars. Huxley, Auchincruive No. 11, American Aberdeen, and Climax gave sufficiently consistent results with 21 isolates for 3 races to be identified.

Jaarverslag over de werkzamheden van het Instituut voor Plantenziektenkundig Onderzoek in 1959. [Report on the work of the Institute for Phytopathological Research in 1959.]—186 pp., 18 fig., 1 graph, 1960. [Engl. summ.]

Information is given from the sections on mycology and bacteriology (by A. M. van Doorn) (pp. 62–87); virology (Miss F. Quak) (pp. 88–113); study of resistance (J. C. s' Jacob) (pp. 126–145); biochemical research (J. H. Venekamp) (pp. 153–158); and aerial pollution (F. Spierings) (pp. 159–173).

As in previous years aacuram [**39**, 115] at 0·2% and cuprex at 0·057% exerted a strong curative action against apple and pear scab (*Venturia inaequalis*, *V. pirina*). In spraying tests (4 applications) on Golden Delicious apple and Clapp's Favourite pear the 2 compounds caused no damage to apple but pear was adversely affected, especially by aacuram. However, in the field 6 treatments with 0·09–0·15% cyprex were non-phytotoxic to Louise d'Avranches pear and Jonathan apple. Apple mildew (*Podosphaera leucotricha*) conidia were found to be still viable on excised inoculated shoots of Golden Delicious after 9 days. The reticulate, rugose areas produced by the fungus on young fruits in the field developed largely between 20 Apr. and 11 May, i.e. from the rosebud stage until the end of the blossom, while bud infection occurs only from the end of Apr. to the end of June. Complete protection during this period appears to be impracticable, even by weekly treatments with karathane, but the use of a larger quantity (1,200 instead of 300 l./ha.), applied

with an automatic mist-sprayer, offers better prospects of extensive coverage of the trees [cf. **40**, 71]. *Phytophthora cactorum* was isolated on 1 Mar. from the bark of apple vars. Zigeunerin (1st record on this var.) and Perzikrode Zomer (seldom attacked).

From the beneficial effects observed on cherry trees in 1959 of spraying 6 times with oxyquinoline sulphate in 1956 it seems probable that the incidence of *Pseudomonas mors-prunorum* [**36**, 654] may be permanently reduced by the treatment. The fact that the pathogen produces the same symptoms on bean [*Phaseolus vulgaris*] leaves as *Pseudomonas phaseolicola* may enable the action of certain plant-protectives on bacterial canker to be more easily followed on bean than on the trees.

Foot rot of endive was more severe during the autumn than in previous years, resulting in a loss of $< \frac{1}{2}$ the crop. The disease appears to be a genuine wilt, spreading from the older to the younger leaves and inducing a brownish-black discoloration of the interior of the tap-root and the plant base, though the exterior of the root system appears healthy throughout. The soil was shown by inoculation experiments to be the source of infection.

Further evidence was obtained of the transmissibility through gherkin seed of *P. lachrymans*.

It was demonstrated in the course of studies on the nature of resistance to *Phytophthora infestans* in potatoes that little or no infection develops in certain vars., e.g. Bravo and Libertas, inoculated after removal of the skin. *Streptomyces scabies* was effectively combated by soil treatment with PCNB at 30 kg./ha.

During the dry season of 1959 the development of *Ascochyta linicola* on flax [cf. **38**, 408] was almost prevented by seed treatment with a number of organic Hg compounds and 1 based on Hg—a quinone derivative. The storage of flax seed infected by *Botrytis cinerea* [**39**, 553] at a temp. of 35° for 23 days killed the fungus without impairing germination.

Root rot (*Cylindrocarpon radicicola* and *Thielaviopsis basicola*) of cyclamen [**36**, 587] may be appreciably reduced by steam sterilization of the soil and treatment of the potting soil with captan at 0·5 kg./sq. m.

The testing of Eersteling [Duke of York] potato plants grown from meristem cultures for latent infection by viruses X and S was continued; X had been eliminated but S was still in evidence.

In certain types of light soil [tobacco] rattle [potato stem-mottle virus str.] was detected at depths of up to 80 cm. In a search for potential vectors the nematodes *Pratylenchus pratensis* and *Tylenchorhynchus dubius*, together with smaller numbers of *Hoploaimus uniformis*, were identified in infested soils, principally in the upper layers (to a depth of 40 cm.), while a large, unidentified sp. occurred as far down as 160 cm., with a max. population at between 30 and 100. Transmission of the virus by nematodes was demonstrated by experiments on tobacco var. White Burley.

The results of field trials in 6 localities demonstrated the impracticability of the control of lettuce mosaic virus by the use of healthy seed unless it is used throughout an entire area.

A new physiologic race of barley stripe rust (*Puccinia glumarum*) [*P. striiformis*: **38**, 736] was distinguished by the reaction it induced on seedlings of var. Agio, hitherto completely resistant at this stage.

A new race of *Plasmodiophora brassicae* was differentiated in variety trials at Didam by the high incidence of infection it caused on marrow-stem kale.

The organic acid contents of tomato plants inoculated with potato viruses X, Y, and leaf roll, tobacco mosaic, and an [unnamed] cherry virus were found to be higher (especially as regards oxalic, malic, and citric acids) than those of healthy ones.

Research on air pollution near industrial plants is in progress. Most of the damage

is attributable to HF or SO_2, while ZnO and Cl were also involved in some instances. Dust from railways (Fe), chimneys (ash), and the like was shown to impair the quality of fruits and vegetables and reduce the intensity of light available for glasshouse crops.

Piekarczyk (K.). **Sprawozdanie z międzynarodowej konferencji do spraw kwarantanny, prognoz i sygnalizacji w Pradze w dniach od 6 do 18. x. 1959.** [Report from the International Conference for Quarantine, Forecasting, and Warning Services, Prague, 6–18 Oct. 1959.]—*Biul. Inst. Ochr. Roś., Poznań*, 8, pp. 13–26, 1960. [Russ., Engl. summ. Cyclostyled.]

A report [cf. **39**, 458] from Pracownia Prognoz i Sygnalizacji, Poznań, Poland, on the topics dealt with, including general organization, co-operation with the service for plant protection [**40**, 12], terminology, long- and short-term forecasting, its technical and economic aspects, exchange of reports, etc.

Краткие итоги научных исследований по защите растений в северо-западной зоне СССР. Тезисы докладов XII планово-методического совещания по защите растений в северо-западной зоне СССР. [Brief results of scientific research work on plant protection in the N.W. zone of the U.S.S.R. Summarized reports of the 12th conference on planning and methods for plant protection in the N.W. zone of the U.S.S.R.]—291 pp., 3 fig., Riga, Baltic Sta. Plant Prot., All-Union sci. Res. Inst. Plant Prot., 1959. Roubles 5.40.

In the introductory sect. (pp. 7–17) [cf. **40**, 72] general questions of phytosanitary organization and of application of toxic substances in the Latvian S.S.R., and of a unification of terminology used in plant protection, are discussed; the section on virus diseases (pp. 193–203) is largely devoted to potato. Of the 36 papers on fungal and bacterial diseases (sect. V, pp. 131–192) the following may be noted:

Akhramovich (M. L.). [Investigation of the effect of unslaked lime on the causal agent of Potato wart.] (p. 133). At the Lithuanian Colorado Beetle, Nematodes and Potato Wart Sta. soil dressing before planting with unslaked lime at 4 kg./sq. m. rendered potato plants entirely free from wart [*Synchytrium endobioticum*]; at 6 kg./sq. m. incidence was 5%, compared with 83 and 99·2%, respectively, in the controls. An application at 4 kg. is recommended in May and in July.

Bobkova (Mme Z. S.). [Pyrites ash as a substitute for Bordeaux mixture in control of Potato diseases.] (pp. 134–135). At Jelgava énto-fito G.S.U. Latvian S.S.R. dusting with pyrites ash at 140 kg./ha. at the beginning of flowering and 3–4 weeks later resulted in 11·3% incidence of blight [*Phytophthora infestans*] in Mittelfrühe and 9·6 in Export, compared with 11·8 and 10·1, respectively, obtained by spraying with Bordeaux mixture (20·3 in the Mittelfrühe control).

Gavrilova (Mme E. A.). [Effect of phytoncides on the causal agents of Tomato bacterioses.] (pp. 138–139). At Velikie Luki agric. Inst. phytoncides from leaves and fruits of a number of tomato vars. were shown to weaken *Pseudomonas* [*Xanthomonas*] *vesicatoria*, *P. solanacearum*, *P.* [*Agrobacterium*] *tumefaciens*, *Bacterium carotovorum* [*Erwinia carotovora*], *B. phytophthorum* [*E. atroseptica*], *Bacillus mesentericus*, and the non-pathogenic *P. heterocea in vitro*, thus aiding the phage to lyse the colonies. Mayak and Pushkinskiĭ, the most resistant vars. in the field, proved also the most phytoncidal, while cultures of *P.* [*X.*] *heterocea* and *B. mesentericus* were the most sensitive. The phytoncidal activity was weakest in seedlings and strongest in budding and flowering plants.

Zherbele (I. Ya.). [Diseases and pests of Raspberry in the Latvian S.S.R. and preliminary results of the investigation of the means of control of diseases.] (pp. 143–144). This survey by the Baltic Sta. Plant Prot. states that the most severe disease was 'burst bark' and early drying-off of fruit-bearing shoots due to a complex of physiological, entomological, and fungal causes, in which *Didymella*

applanata [cf. **39**, 30; **40**, 118: map 72] played an important part. The infection of young shoots first appeared in mid-June and ripening of the perithecia on 2-yr.-old shoots occurred at the end of Apr., with max. conidial output in July and Aug. Insect injuries favoured the development of the disease. Together with *D. applanata* young stalks were affected by *Colletotrichum rubicola* and *Leptosphaeria coniothyrium*, *Botrytis cinerea*, and *Fusarium* sp. Anthracnose (*Elsinoe veneta*) attacked leaves, petioles, stalks, shoots, and fruits; on young stems it was first noticed in early June. Less serious than all these were *Phragmidium rubi-idaei*, *Septoria rubi*, and *Sphaerotheca macularis*. Various types of virus mosaic (yellow, green) were often noticed.

Zherbele (I. Ya.). [On the specialization of *Ascochyta lallemantiae* sp. nov.] (pp. 145–146). A record from the same centre of *A. lallemantiae* [**38**, 292] on living leaves of *Lallemantia iberica* in the Riga area. Inoculation of 14 spp. of Labiatae showed high specificity for the natural host.

Kalninya (V. K.). [Diseases of Maize and measures for their control in the Latvian S.S.R.] (p. 150). The same centre notes a gradual increase of blister smut (*Ustilago zeae*) [*U. maydis*: map 93], lately affecting in particular the var. Voronezhskaya 80. Rot of germinating seeds caused by *Fusarium heterosporum*, *F. culmorum*, *F. avenaceum* ssp. *volutum*, and some moulds caused 70–96% damage in clay soils during wet weather. On the other hand *Diplodia zeae*, discovered on imported seed of the American hybrid Pioneer No. 349, did not spread appreciably. Thiram (50%) gave good control, particularly of the *F.* spp., and also increased yields.

Kozhevnikova (Mme N. N.). [Determination of the parasitic activity of *Phytophthora* strains.] (pp. 156–158, 2 fig.). The method used by All-Union sci. Res. Inst. Plant Prot. allows evaluation within 5–7 days of the virulence of *P.* [*infestans*] strs. both in culture and under natural conditions. It is based on the differential reactions of the leaves and tubers of certain potato vars. [listed] to virulent and mild strs.

Lauska (Mme A. Ya.). [Control of butt rot of Pine.] (pp. 161–162). At Inst. Forestry Problems Wood Chemistry Latvian S.S.R. stripping of forest litter reduced the intensity and checked the spread of this disease caused by *Fomes annosus* [cf. **38**, 231], while tillage had no effect. Trenching is recommended to localize the disease.

Malenev (F. E.). [Some results of the investigation of the influence of microelements on the increase of resistance to diseases in Potato.] (pp. 163–164). Resistance to blight [*Phytophthora infestans*], common scab [*Streptomyces scabies*], black scurf [*Corticium solani*], and bacterioses was tested by Leningrad agric. Inst. on plants grown from tubers dipped in 0·02% solutions of various Cu, B, Mn [**37**, 592; **38**, 420], and Zn salts and in soil dressed with these solutions or with the dry salts at 3–5 kg./ha. Cu salts increased resistance the most (2–3 times) in both haulms and tubers, Mn chiefly that of haulms, B of tubers. The effect of Cu and Mn was rapid owing to their easy mobility in the plant, that of B slow. Excess N in the soil rendered Cu and Mn salts, and K, B, and Zn less effective. Whereas in very wet years Cu inhibited the growth of tubers, B induced an early dying-off of the tops in drought. These ill effects were avoided by mixed applications of Cu and B, or Cu, B, and Mn.

Mikheeva (Mme R. I.). [Causes of Cucumber wilting in greenhouse and garden cultivation in the Latvian S.S.R.] (pp. 168–169). The parasites involved were shown by the Baltic Sta. Plant Prot. to be *Fusarium* spp. (66·6–89·3% incidence), *Verticillium alboatrum* [map 365] (8–20%), and *Sclerotinia libertiana* [*S. sclerotiorum*] (0·3–30%). A preliminary treatment of soil with $CaCN_2$ at 200 g./cu. m., alone or with phosphorobacterin, or with granosan at 200 g./cu. m., alone, with phosphorobacterin, or with phosphorobacterin+azotobacterin, resulted in a yield increase by 0·6–60·8%, though infection was not entirely eliminated.

Strukchinskas (T.). [Some measures of control of the bacterioses of Bean in the conditions of the Lithuanian S.S.R.] (pp. 174–175). At the Lithuanian sci. Res. Inst. Agric. good control of diseases caused by bacteria, of which *Pseudomonas* [*medicaginis* f. sp.] *phaseolicola* [map 85] was the most serious, was obtained by treating bean [*Phaseolus vulgaris*] seed with 0·1% $HgCl_2$ for 20 min. Granosan at 300 g./100 kg. slightly reduced infection, but inhibited germination. The most resistant vars. were 235–1, 207–5, and 235–15.

Shkipsna (Ya.). [*Typhula graminearum* Gul. a parasite of perennial leguminous forage plants in the conditions of the Latvian S.S.R.] (p. 190). This fungus, along with *Fusarium* sp., *Sclerotinia trifoliorum*, and *T. trifolii*, was noted by the Stendenskaya Selection exp. Sta. to cause weak tillering and death of lucerne and white, pink, and red clover. In the investigated areas it affected 11–34% lucerne and 9–26% clover seed plants.

Annual Report East African Agriculture and Forestry Research Organization, 1959. (Record of Research for the period 1st January to 31st December, 1959). — 91 pp., 1960. *Sh.* 3/50.

In the sect. on plant improvement and protection (pp. 40–55) [cf. **39**, 268], H. H. Storey & A[udrie] K. Howland describe further studies on the genetics of resistance in maize to maize streak virus. The indications are that a plan for breeding for resistance can now be drawn up, though difficulties in classifying the range of reactions to streak have not yet been entirely resolved.

Dealing with work on stem-pitting of coffee [cf. **38**, 746; **39**, 456], F[rances] M. L. Sheffield states that the condition may be described as consisting of abnormalities in the cellular structure of the xylem which sometimes cause the cylinder to become fluted in outline and with pits and furrows under the bark. The available evidence does not indicate the existence of any relationship between the death of coffee trees and stem-pitting. Histological studies showed that cell development is very easily disturbed. As stem-pitting symptoms are usually confined to that part of the main stem or sucker within 1 ft. or so of the ground. the condition is possibly due to physical causes.

Although a number of well-known virus test plants and a series of monocotyledons (mostly raised from seed) were inoculated mechanically with sap from sugarcane affected by ratoon-stunting [virus] disease, no symptoms have so far developed on the inoculated plants.

Annual Report of the Cameroons Development Corporation, 1959.—29 pp., 4 pl. (7 fig.), [1960].

In the agricultural activities sect. (pp. 5–9) of this report [cf. **38**, 656] it is stated that Panama disease [*Fusarium oxysporum* f. *cubense*] continued to spread. Treatment of sigatoka of banana [*Mycosphaerella musicola*: **39**, 726] with ground machines and fixed-wing aircraft has proved difficult; ascospore infection now appears to predominate over conidial infection.

The occurrence of vascular wilt [*Fusarium oxysporum*: **37**, 52] of oil palms has been confirmed and it is spreading rapidly.

Annual Report of the Agricultural Experiment Stations, Florida, for the year ending June 30, 1959.—415 pp., 32 fig., 9 graphs, [1960].

Some of this information has been noticed already. In the report from the Plant Path. sect. (pp. 136–145) [cf. **39**, 75] C. W. Anderson states that further transmission tests with the *Solanum carolinense* virus proved it to be sap- and graft-transmissible but produced no clear-cut evidence of susceptibility of other *S.* spp. or of spp. of *Nicotiana*, *Physalis*, and *Capsicum*. An unusual str. of tobacco ring spot virus proved to be the cause of eggplant yellows disease.

J. R. Large reports that of the 44 fungicides tested during the past 10 yr. for the control of pecan scab (*Fusicladium effusum*) [**38**, 719] only those best adherent to the foliage are satisfactory in wet seasons, namely Bordeaux mixture throughout or Bordeaux mixture for applications 1 and 2 followed by ziram or zineb (dithane Z 78)+summer oil in applications 3, 4, and 5; in dry seasons the less phytotoxic zineb+$\frac{1}{4}$% summer oil is best. In 1958 orchard sanitation+Bordeaux improved scab control 8–10%.

S. A. Ostazeski & P. Decker found that the only consistently successful eradicant of brown spot disease (*Pleiochaeta setosa*) from lupin seed was a pre-treatment in water at 45° C. for 1 hr. followed by a bath at 50–52° for 5–15 min. The effectiveness of hot air treatment depends upon the moisture content of the seed and an 8-hr. hot air treatment at 70–75° shortly after harvest (estimated moisture content 14%) was effective.

M. K. Corbett reports that sweet yellow lupin seed, originally free from bean yellow mosaic virus [cf. **39**, 682] and used in protected and unprotected plots, contained 3 and 8% virus-infected seed, respectively, after 2 yr. exposure, and contributed so much to the within-field spread that it nullified any effects of the protecting border. The lupin str. (LV1) of bean yellow mosaic virus has been purified by rate zonal density-gradient centrifugation. The most commonly occurring particle length was 750 mμ and all particles had a width of approx. 18 mμ.

The *Phytophthora* sp. isolated from castorbean plants [*Ricinus communis*] at Merritt Island by R. S. Orellana was found to be *P. parasitica* var. *nicotianae* from adjacent tobacco.

M. K. Corbett & C. W. Anderson established that leaf necrosis of *Cattleya* orchids is caused by [orchid] *Cymbidium* mosaic virus [**39**, 713], which withstood dilutions of 10^{-4} but not 10^{-5}, a 10-min. exposure to 68° C. but not 70°, and ageing *in vitro* for at least 14 days.

Further studies by H. H. Luke on the reaction of oat selections to crown rust [*Puccinia coronata*: cf. **38**, 201] indicate that resistance to the most prevalent Landhafer races, 264 and 290, has been combined with resistance to races 203 and 216, the most prevalent in the S.E. area. Selections carrying this combined resistance were derived from C.I. 7172 × (0–200 10 × Southland). Both maternal and paternal parents are susceptible to race 290 under greenhouse conditions but, unexplainably, 2 distinct resistant reactions were found among the progeny.

T. E. Freeman reports that 4 oz. calocure, 6 oz. phenyl mercuric acetate, and 6 oz. semesan turf fungicide 1,000 sq. ft. gave a fair degree of control of cottony blight (*Pythium aphanidermatum*) of rye grass [*Lolium* sp.]. Ormond and common Bermuda grass [*Cynodon dactylon*] were the most severely affected by dollar spot (*Sclerotinia homoeocarpa*), Everglades I and Tiffine only slightly. Cottony blight was most severe on Bayshore and common, while Tiffine, Tiflawn, and Everglades I were only slightly damaged. All were more resistant to cottony blight than rye grass. Calocure at 2 oz. or cadminate at $\frac{1}{2}$ oz./1,000 sq. ft. were the most effective for dollar spot control on Ormond.

H. N. Miller notes that actidione PM (0·027%) at 2 p.p.m. consistently eradicated powdery mildew [*Sphaerotheca pannosa*: **38**, 699] on roses after 2–4 applications at weekly intervals, but not at 1 p.p.m. Formulations of actidione were applied as pre-flowering and flower sprays to control azalea [*Rhododendron*] flower blight [? *Ovulinia azaleae*: **40**, 112]. All materials at the concs. used were phytotoxic, but the blight was held to a minimum.

At the Citrus Sta. M. Cohen (pp. 237–238) found that the 3-week-post-bloom Cu treatment for melanose [*Diaporthe citri*: **39**, 77] on Marsh grapefruit and Valencia oranges was superior to sprays at full bloom and 2 days after petal fall, and that Cu sprays were far superior to all others. Niacide Z (1½ lb.) was the best material tested on Temple orange against citrus scab [*Elsinoe fawcettii*]; others

very satisfactory were fermate (1½ lb.) and tribasic $CuSO_4$ (1½ lb.). The latter was also effective against citrus greasy spot [**39**, 172].

L. C. KNORR & W. C. PRICE (pp. 244–246) report a troublesome disease of Murcott orange trees, tentatively named 'fovea'. Both the gumming and pitting of the fibrovascular system of the scion part of the trunk, from the bud union up, and the external symptoms resemble xyloporosis. The cause of 'measles' [**36**, 810], a chlorotic stippling of citrus foliage, of little consequence, remains unknown, but is apparently not bud-transmissible.

R. E. STALL (pp. 291–292) reports that good control of *Botrytis cinerea* on tomatoes was obtained at the Everglades Sta. by dyrene alone or +maneb. Dyrene+maneb was superior to ferbam+maneb in controlling the ghost spot phase of the disease. Dyrene and combinations of dyrene+zineb or Cu controlled *Stemphylium solani* well [cf. **38**, 545]; maneb and maneb+thiram or ferbam were only slightly less effective.

At the Gulf Coast Sta. R. O. MAGIE (p. 304) in further work on the control of *Fusarium* disease of gladioli found that best results were obtained with elcide 73 (12% ethylmercurithiosalicylic acid) at 2 pt./100 gal. [**38**, 698].

In a test by J. P. JONES (p. 311) bacterial spot (*Xanthomonas vesicatoria*) was not found in seedlings derived from inoculated tomato seed treated with bactericides or from inoculated and uninoculated untreated seed.

C. R. JACKSON (p. 314) observed good growth *in vitro* of *Botrytis gladiolorum* within the limited range of 16–20° C., that at 20° being significantly better. *Curvularia trifolii* from gladiolus grew best at 24, 28, and 32°; mycelial growth was significantly greater at 28°. Max. growth of *Stromatinia* [*Sclerotinia*] *gladioli* occurred at 24° but was not significantly greater than at 20°. The opt. range of 20–24° corresponds to field temp. conditions. *Cercospora antirrhini* on antirrhinum [**38**, 696] is described and illustrated (pp. 319–320).

From the Sub-trop. Sta. R. A. CONOVER (p. 358) reports that potato virus Y was the most destructive disease on tomatoes during 1957–8. *Verticillium dahliae* on tomatoes was very widespread in Dade County, inducing wilting and yellowing of lower leaves, though plants do not die, but suffer 30–40% reduction in yield.

Field studies by T. W. YOUNG (pp. 364–367) on 'soft nose' of mango fruits [**37**, 670] suggested that the breakdown is related to excess N nutrition.

L. A. MCFADDEN reports (pp. 370–371) an unknown leaf spot disease damaging chrysanthemum plantings during the autumn and spring rainy seasons. The spots are dark brown to black with lighter tan centres. A clear line of demarcation, without yellowing, separates the diseased and healthy tissues and under wet conditions spots may coalesce. On careful examination the spots exhibit a target pattern. The pathogen appears to be a new and distinct sp. of *Pseudomonas*.

Further studies on the cultural and biochemical characteristics of the pathogen of *Dieffenbachia* [*picta*: **39**, 79] and cross-inoculations indicated a new sp. for which the name *Erwinia dieffenbachiae* is being considered. Agrimycin 100 when used as a pre-planting liquid dip treatment gave the best control.

At the Strawberry Investigations Lab. (pp. 394–395) A. N. BROOKS observed that the roots of most strawberry plants in the nursery field were heavily infected by *Rhizoctonia* sp. in the summer of 1958. Terraclor in suspension in a 55-gal. drum was sucked into the irrigation stream and distributed at 34 lb./acre at 10-day intervals (3 applications in all). When the plants were dug in Oct. the roots in the top 2½ in. of soil were in good condition; those below showed some *R.* infection.

At the Watermelon and Grape Investigations Lab. N. C. SCHENCK (pp. 396–397), in a comparison of watermelon seed from 7 commercial sources, found that the av. infection by *Mycosphaerella citrullina* [*M. melonis*] was 7·9%. The fungus survived for over a year in field soil. Other pathogens of watermelon mentioned as

causing fruit rots are *Cylindrocladium scoparium*, *Pellicularia* [*Sclerotium*] *rolfsii*, and *Macrophomina phaseoli*.

JOHNSTON (A.). **A preliminary plant disease survey in North Borneo.**—43 pp., Rome, Food and Agric. Organization of the United Nations, 1960. [Mimeographed.]

This 2nd survey made in response to the recommendation of the Plant Prot. Committee for the S.E. Asia and Pacific Region and presented similarly [cf. **39**, 536] is based on observations made during a 3-week visit in Sept. 1959. The most potentially serious diseases of cacao are die-back (*Calonectria rigidiuscula*) and pink disease (*Corticium salmonicolor*) [map 122]. Black pod (*Phytophthora palmivora*) was not observed, but had previously been collected and authenticated. On coffee *Hemileia vastatrix* [5] was the most widespread disease, as was *Puccinia polysora* [237] on maize. The most serious threat to manila hemp is [banana] bunchy top [virus: 19] and the most destructive diseases of rice were blast (*Piricularia oryzae*) [51] and (somewhat less) *Cochliobolus miyabeanus* [92]. Tobacco was severely affected by bacterial wilt (*Pseudomonas solanacearum*) [138] and frog-eye (*Cercospora nicotianae*) [172].

REITZ (L. P.) (Editor). **Biological and chemical control of plant and animal pests.** —xii+273 pp., 8 fig., Washington, D.C., American Association for the Advancement of Science, 1960. $5·75.

This publication contains the contributions to a symposium in the Agric. sect., Indianapolis meeting of the A.A.A.S., 28–30 Dec., 1957. Papers mainly concerned with plant diseases are: in Sect. I ('The public's stake in pest control') J. R. HANSBRUGH, 'Control of forest diseases' (pp. 15–22); in Sect. II ('Recent advances in chemical control') G. L. MCNEW, 'Fungicides and bactericides for controlling plant diseases' (pp. 49–71); and in Sect. III ('The biological control of pests') W. C. SNYDER, 'Antagonism as a plant disease control principle' (pp. 127–136); J. D. BRIGGS, 'Pathogens for the control of pests' (pp. 137–148); E. H. STANFORD, 'Breeding field crops for resistance to disease' (pp. 217–228); and J. R. SHAY, 'Breeding vegetable and fruit crops for resistance to disease' (pp. 229–244). Bibliographies accompany most of the contributions.

GOLOVIN (P. N.) (Editor). Словарь-справочник фитопатолога. [The phytopathologist's handbook.] –414 pp., illus., Moscow–Leningrad, Sel'khozgiz, 1959. Roubles 16·50.

This is a dictionary of phytopathological subjects with short articles on each and an index of Latin binomials of the pathogens (pp. 401–414).

BURKHOLDER (W. H.). **Present-day problems pertaining to the nomenclature and taxonomy of the phytopathogenic bacteria.** –In *Omagiu lui T. Săvulescu* [see **39**, 667], pp. 119–127, 1959. [Roman. summ. 28 ref.]

Presenting the taxonomic history of many gen. and spp. the author pleads for care in changing names and advocates the use of the International Code of Nomenclature for Bacteria as a guide, warning particularly against the arbitrary introduction of varieties and pointing out the superfluousness of *formae speciales*. There is a discussion of the status of *Pectobacterium* and *Erwinia* and other genera of plant pathogens in relation to symptomatology and the capacity to produce pectolytic enzymes. In conclusion 4 nov. combs. are made, including *Xanthomonas fuscans* [**39**, 457] in place of *X. phaseoli* var. *fuscans*, *P. fraxini* (*P. savastanoi* var. *fraxini*), and *X. sojensis* (*X. p.* var. *sojensis*).

GEGENAVA (Mme G. V.). К методике определения сравнительной фитотоксичности инсектофунгисидов. [On methods for determining the comparative

phytotoxicity of insecto-fungicides.]—*Soobshch. Akad. Nauk Gruz. S.S.R.*, **20**, 6, pp. 693–699, 1 graph, 1958.

The methods used at the Georgian Inst. for Plant Protection, Tiflis, for assessing the phytotoxicity of chemicals and for calculating the chemotherapeutic index are described. For this purpose chemical burns may be treated as disease symptoms and assessed by the Horsfall & Barratt method [**25**, 39]. Calculation of damage, according to the Weber-Fechner law, is based on the percentage of damaged tissue, where this is under 50%, and on undamaged where over 50%. Concrete examples of the application of the method are given.

Surany (P.). **Diseases and biological control in Rhinoceros Beetles.**—*Tech. Pap. S. Pacif. Comm.* 128, vi+62 pp., 82 fig., 1 map, 1960. [Fr. summ. 251 ref.] 6*s*.

A 4-yr. survey of the diseases of *Oryctes* spp. in India, S.E. Asia, and Africa indicated that fungal infection of the beetles (pp. 43–46) is common, but manifestation of fungal disease is not. Furthermore, only a relatively few specimens appeared to succumb to a single infection, apparently owing to competition with and interference by other types of disease. In 5 countries surveyed in Asia under 15% of *O. rhinoceros* displayed visible signs of infection by *Metarrhizium anisopliae* [cf. **37**, 445] and in Africa under 5% of *O. monoceros* and *O. boas* were killed by it. In contrast, a detailed examination of several hundred *O.* specimens disclosed hyphae and fungal growths in nearly one-half, suggesting that unapparent fungal infections in *O.* are somewhat common. Apart from *M. anisopliae* no other important spp. of entomogenous fungi have been found associated with *O.*

Maruzzella (J. C.) & Scrandis (D.). **The antifungal properties of X-irradiated essential oils and oil combinations.**—*Naturwissenschaften*, **47**, 12, p. 282, 1960.

At the Biol. Dept, Long Island Univ., Brooklyn, N.Y., X-irradiation slightly enhanced the activity against *Rhizopus nigricans* [*R. stolonifer*], *Saccharomyces cerevisiae*, *Fusarium oxysporum*, and *Gibberella fujikuroi* on Sabouraud's maltose broth of oils of caraway [*Carum carvi*], myrrh [*Commiphora myrrha*], niaouli [? *Melaleuca viridiflora*], red *Origanum*, and peppermint. The effects of 25 combinations of the oils, both irradiated and untreated, were less potent than when they were used singly.

Edgington (L. V.) & Dimond (A. E.). **Controlling translocation of quaternary ammonium chemotherapeutants with cations and solvents.**—Abs. in *Phytopathology*, **50**, 9, p. 634, 1960.

These fungicides are relatively immobile in plants because the positively charged ion is adsorbed on the negatively charged plant tissue [cf. **39**, 667]. The effect was counteracted in tomato cuttings by the addition of 10^{-2}M $CaCl_2$. Solvents that prevent adsorption or desorb quaternary ammonium ions include ethanol, isopropanol, acetone, tetrachloroethane, and nitrobenzene. Dissolving these fungicides in n-octanol or dodecanol enables the penetration of elm bark, which does not occur with water as a solvent, and provides protection of the underlying sapwood against vascular pathogens.

Horsfall (J. G.) & Rich (S.). **Antisporulant action of hexachloro-2-propanol.**—Abs. in *Phytopathology*, **50**, 9, p. 640, 1960.

In this further contribution [cf. **39**, 153] the strong antisporulant action of 1,1,1,3,3,3-hexachloro-2-propanol against a number of fungi is reported. A study of related compounds suggests that the site of activity is the hydroxyl group. The substance is cheap to produce and may be a useful additive to a protectant.

Munnecke (D. E.) & Ferguson (J.). **Effect of soil fungicides upon soil-borne plant pathogenic bacteria and soil nitrogen.**—*Plant Dis. Reptr*, **44**, 7, pp. 552–555, 1960.

At Dept Plant Path., Univ. Calif., Los Angeles, stem pieces of tomato infected by either *Agrobacterium tumefaciens* or *Corynebacterium michiganense* and *Pelargonium hortorum* by *Xanthomonas pelargonii* were buried in plastic screen bags in flats of soil which was then treated with fungicides under conditions similar to those found in Californian nurseries. Bacterial viability was tested by inoculating susceptible plants with infusions of the treated tissues. Satisfactory control was achieved with all 3 fungicides, the probable lethal doses of vapam being 300, 800, and 400 lb./acre for the 3 bacteria, respectively, chloropicrin 1, 2, and 2 ml./cu. ft., and methyl bromide (efficient only under moist conditions) 2, 3, and 3 lb./100 cu. ft.

Coursey (D. G.). **Importance des microorganismes dans la lipolyse de l'huile de Palme au cours du stockage.** [The importance of micro-organisms in the lipolysis of Palm oil during storage.]—*Oléagineux*, **15**, 8–9, pp. 623–630, 4 graphs, 1960. [24 ref.]

In experiments by the W. African Stored Products Res. Unit, Port Harcourt, Nigeria, during 1956–60 on the hydrolysis of palm oil under ordinary conditions of storage in Nigeria, the few thorough bacteriological and mycological examinations made revealed 6 moulds: *Aspergillus niger*, *A. terreus*, *A. giganteus*, *Neurospora crassa*, *Trichoderma viride*, and *Paecilomyces varioti*. Of these *A. niger* is known to be lipolytic and associated with the deterioration of oleaginous fruits, while *A. terreus* has been isolated from damaged cotton seed. *N. crassa* is no doubt identical with the red mould found in palm-fruit refuse in the former Belgian Congo and is known to be only slightly lipolytic (*J. Amer. Oil Chem. Soc.*, **29**, 12, pp. 596–601, 1952). Both *A. terreus* and *P. varioti* were reported (*in litt.*) to be lipolytic on tributyrin agar. The rapidity of the lipolytic action of these moulds depends on the amount of water in the oil and its effect in the moulds. An exhaustive investigation into the micro-organisms present in palm oil in Nigeria is in progress.

List of intercepted plant pests, 1959. —[*S.R.A. Bur. Ent. Wash.*], 86 pp., 1960.

Diseases intercepted [cf. **38**, 276] included citrus cancrosis B (*Xanthomonas* sp.) [*X. citri*: map 11] from Argentina, Brazil, and Uruguay, and *Cercospora grandissima* on *Dahlia* from Argentina, *Puccinia carthami* on safflower from Portugal, and *P. horiana* on *Chrysanthemum* from Australia.

Moreau (C.). **La vocation phytopathologique du Laboratoire de Cryptogamie du Muséum National d'Histoire Naturelle.** [The phytopathological activities of the Cryptogamic Laboratory of the National Museum of Natural History.]—*Rev. Mycol., Paris*, **25**, 2, pp. 81–134, 1 pl., 1960.

The 1st part of this interesting account (pp. 85–90) deals briefly with the history of the Chair of Cryptogamic Botany since 1904, the activities of the herbarium and the culture collection, the amenities offered to workers, publications, and teaching. The 2nd (pp. 91–134) covers research (under 5 heads), lists of parasitic fungi, studies on parasitic fungi, diseases of different crops and of non-cultivated plants, and plant disease control. Each sect. is followed by a list of relevant publications.

Vasil'eva (Mme L. N.) & Azbukina (Mme Z. M.). Некоторые итоги и перспективы микологических и альгологических исследований на Дальнем Востоке. [Some of the achievements and prospects of mycological and algological researches in the Far East.]—*Ex* Биологические Ресурсы Дальнего Востока [Biological Resources of the Far East], pp. 92–96, Moscow, Acad. Sci. U.S.S.R., 1959. [28 ref.]

A survey from the Cryptogamic Lab., Far Eastern Branch Acad. Sci. U.S.S.R.,

of the principal mycological publications relating to the Soviet Far East, from the inception of mycological studies in 1823 to the present time; the main lines and achievements of recent researches in the area are briefly reviewed.

JOHNSTON (A.). **Common diseases and pests of crops in Malaya with suggestions for their control.**—*Bull. Dep. Agric. Malaya* 110, 34+2 (unnumbered) pp., 8 pl. (39 fig.), 1959. $1·00 or 2*s.* 4*d.* [47 ref.]

The 1st sect. (pp. 4–16) of this bulletin is devoted to diseases [cf. **34**, 548], and is divided into 3 columns under the headings Crop and Disease, Treatment, and Remarks. After each disease reference is made to the relevant title in the bibliography (articles published in Malaya from which fuller information may be obtained).

HEPDEN (PAMELA M.). **Studies in vesicular-arbuscular endophytes. II. Endophytes in the Pteridophyta, with special reference to leptosporangiate ferns.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 559–570, 2 fig., 1960. [45 ref.]

In further studies [cf. **37**, 142] at the Dept Bot., Univ. Bristol, natural infection of fern sporophytes and prothalli with an endophyte resembling but not identical with *Pythium ultimum* is described. The addition of 2% sucrose to inoculated prothalli of *Phyllitis scolopendrium* improved the growth of the *Pythium* and eventually killed the prothalli. Infection of young sporophytes took place from the soil and not via the infected parent prothallus. The establishment of the vesicular-arbuscular endophyte in ferns depends on a limited range of environmental conditions.

KUĆ (J.). **A biochemical study of the nature of disease resistance in plants.**—*Diss. Abstr.*, **20**, 11, pp. 4260–4261, 1960.

In further work [cf. **39**, 218] at Purdue Univ., Indiana, substances inhibiting the growth of *Helminthosporium carbonum*, *Ceratostomella* [*Ceratocystis*] *ulmi*, and *Fusarium oxysporum* f. *lycopersici* were found in the peel of Idaho-grown potatoes, but not in the pulp tissue. Pulp tissue, however, produced inhibitors subsequent to inoculation with these fungi, except when frozen or autoclaved before inoculation [cf. **35**, 382]. Pure caffeic acid [loc. cit.] inhibited the growth of *H. carbonum* at 1×10^{-3} M, and completely prevented growth at 1×10^{-2} M: chlorogenic acid was approx. half as active. Their activity was increased by other compounds, such as cysteine, present in potato extracts but not inhibitory alone. The inhibitory substances in potato peel are the 1st barrier to infection. If the peel is removed or injured the adjacent pulp tissue produces inhibitory substances round the points of infection.

These data were applied to a study of the resistance of maize to *H. carbonum*. Resistant maize tissue produced an inhibitory substance in response to penetration, while susceptible tissue produced it in lesser conc. Both resistant and susceptible tissues contained little or none of the inhibitor before inoculation.

Sclerotium rolfsii and *Fusarium solani*, parasites of potato, stimulated the pulp tissue to produce substances inhibitory to the growth of *H. carbonum*. These substances and those present in the peel did not, however, inhibit the potato pathogens.

MURTHY (Y. K. S.). **An analysis of factors underlying the specialisation of parasitism with special reference to Fusarium solani (Mart.) App. et Wr. var. minus Wr. and Fusarium fructigenum Fr.**—*Indian J. agric. Sci.*, **29**, 1, pp. 53–59, 1959.

At the Indian agric. Res. Inst., New Delhi, *F. fructigenum* [*Gibberella lateritia*] was made to parasitize potato [tuber] tissues when reinforced with a cultural exo-enzyme

and an endo-enzyme from the germ tubes of *F. solani*. If and to what extent maceration of the tissue was due to the introduction of the enzyme was not determined. Conversely, *F. solani* reinforced by the enzyme of *G. lateritia* parasitized apples more actively than by itself.

Deese (D. C.) & Stahmann (M. A.). **Role of pectic enzymes in susceptibility and resistance to Fusarium and Verticillium wilts of plants.**—Abs. in *Phytopathology*, **50**, 9, p. 633, 1960.

F. spp. grew well on surface-sterilized living stem tissue of resistant and susceptible tomato but more slowly on that of resistant banana. *F.* [*bulbigenum* var.] *lycopersici* on tomato [**39**, 738] and *F.* [*oxysporum* f.] *cubense* on banana produced 3 times more pectic depolymerase on tissue from susceptible vars. than on resistant. *V. alboatrum* formed 3–10 times as much polygalacturonase on susceptible as on resistant tomato tissue. In sap from whole, susceptible plants of tomato inoculated with *F.* and of potato with *V.* pectic enzyme activity was higher than in that from inoculated, resistant plants. It is suggested that resistance to wilt-producing *F.* and *V.* spp. may be due to factors suppressing the formation of fungal pectic enzymes.

Campbell (R. N.). **Effects of nitrogen and calcium on perithecial formation by Ceratocystis fimbriata.**—Abs. in *Phytopathology*, **50**, 9, p. 631, 1960.

An isolate of *C. fimbriata* from oak in Minn. formed abundant perithecia [cf. **37**, 706] at low N levels in a synthetic medium; production was not increased by addition of Ca and was reduced by high N. An isolate from almond in Calif. produced the most perithecia at the highest concs. tested of both N and Ca.

Meyers (S. P.), Prindle (B.), & Reynolds (E. S.). **Cellulolytic activity of marine fungi. Degradation of lignocellulose material.**—*Tappi*, **43**, 6, pp. 534–538, 1 fig., 9 graphs, 1960.

At the Marine Lab., Univ. Miami, Fla [cf. **39**, 750], uniclonal cultures of selected lignicolous asco- and deuteromycetes developing on Manila twine in vessels containing 0·1% yeast extract and sea water have shown high cellulolytic activity, causing significant loss in the tensile strength of the fibre. In the series of inoculation experiments the residual strength of the twine, obtained from the Plymouth Cordage Co., Plymouth, Mass., ranged from 74 to 183 lb. after attack by different spp. compared with 260 in the controls. Particularly severe damage followed infection by *Torpedospora radiata* and *Ceriosporiopsis halima*. Other spp. used in the tests included *Lulworthia floridana*, *Antennospora quadricornuta*, *Lignincola laevis*, *Peritrichospora integra*, *Halosphaeriopsis* sp., *Culcitalna achraspora*, *Humicola hallopallonella*, *Piricauda arcticoceanorum*, *Helicoma* sp., *Alternaria* sp., *Cremasteria cymatilis*, and *Pestalotia* sp.

Because of the close analogies between cordage and wood in proximate analysis, except for the lower lignin content of cordage, the substantial loss of strength in the latter when used as a growth substrate for lignicolous sea-water fungi would appear to be a positive demonstration of the destructive action of these organisms on wood fibres. [Similar information by Meyers & Reynolds appears in *Bull. mar. Sci. Gulf & Caribb.*, **9**, 4, pp. 441–455, 1959; *Developments in Industrial Mycology*, **1**, pp. 157–168, 1960.]

Bibliography of soil science, fertilizers and general agronomy, 1956–1959.—xxv+ 762 pp., Farnham Royal, Bucks., Commonwealth Agricultural Bureaux, 1960. 80*s*.

In the 9th vol. of this series [cf. **37**, 137] a new decimal classification, modifying and replacing the Universal Decimal Classification (UDC) is introduced and is

described in the Preface. Some 14,000 papers are covered, references to Plant Diseases and Protection being on pp. 331–353.

Tranina (Mme N. F.). Влияние обработки почвы на корневую микрофлору некоторых растений. [The effect of soil cultivation on the root microflora of some plants.]—Труд. Инст. Микробиол. [*Trud. Inst. Mikrobiol.*], *1960*, 7, pp. 107–114, 2 fig., 1960.

During studies in 1954–57 of changes in the microflora under wheat and potato with different methods of soil cultivation at Pushkino, Leningrad region, 1,428 isolates of bacteria were obtained. *Pseudomonas solanacearum* [map 138], *P.* [*Agrobacterium*] *tumefaciens*, and *Bacterium xanthochlorum* [*P. xanthochlora*] were found in the rhizosphere of wheat, *P.* [*Xanthomonas*] *translucens* and *P. atrofaciens* on the roots, and *P. solanacearum*, *P. xanthochlora*, and *B. phytophthorum* [*Erwinia atroseptica*] on the roots and tubers of potato.

Meyer (L.) & König (Eva). **Versuchsergebnisse zur mikrobiellen Aufschliessung schwerlöslicher Phosphate durch Bodenpilze.** [Results of experiments on the microbial solubilization of sparingly soluble phosphates by soil fungi.]—*Landw. Forsch.*, **13**, 1, pp. 7–24, 14 fig., 5 graphs, 1960. [Engl., Fr. summ.]

Of the 24 fungi and 3 streptomycetes tested at the Inst. für Bodenkunde der Landwirtschaftlichen Hochschule, Hohenheim, Germany, only those producing acid [unspecified with the exception of *Aspergillus niger*] proved capable of utilizing minute quantities of crude phosphate for the growth of mycelium. The latter reduces the pH of the medium through the production of organic acids, thereby solubilizing phosphates in various states of hardness, with a resultant increase of mycelial development. In every case 3 stages of solubilization were differentiated, beginning with the uptake of P_2O_5 released from the rock by the operation of microbial acid, followed by immobilization of the compound in the fungal tissues, and culminating in its release on their autolysis.

The acid-producing fungi were shown by microscopic examination to react to the presence of mobilizable P by the vigorous production of branch hyphae, which are drawn chemotropically to the rock particles, surrounding them with a dense mycelial network. The most sparingly soluble particles become enveloped by a particularly heavy plectenchymatous mycelium, the branch hyphae of which then attack them. When rock phosphate was the sole source of P, proximity *in vitro* to *A. niger* was found to enable a non-acid-producing and hence by nature phosphorolytically inactive sp. (*Penicillium varians*) to make good growth and move towards the rock by chemotropism.

Barton (R.). **Saprophytic activity of Pythium mamillatum in soils. I. Influence of substrate composition and soil environment.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 529–540, 1960.

At the Dept Cryptogamic Botany, Univ. Manchester, the colonization of organic material in soil by *P. mamillatum* [cf. **37**, 648] was shown to be dependent on the presence of a suitable conc. of a C source; the presence of N did not appear to affect it. Opt. conditions included high soil moisture content, low temp., pH 5·5–7, and fine soil texture; substrates of pH 3–4 were not colonized.

Green (R. J.). **The survival of Verticillium albo-atrum in muck soils.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

When 3 types of soil were inoculated with *V. alboatrum* [cf. **39**, 502] at 1 mg./g. a mycelium-spores inoculum persisted beyond 36 weeks only in sterile muck soil. With pseudosclerotia, the inoculum level at 82 weeks was 81·3% in non-sterile muck soil, 80·5% in sterile muck soil, and 18·3% in non-sterile sandy-loam mineral

soil. It is concluded that *V. alboatrum* persists for long periods in the soil only in a dormant stage.

Bateman (D. F.). **The influence of pH on growth of Thielaviopsis basicola in culture and the development of Thielaviopsis root rots of Poinsettia and Bean in soil.**—Abs. in *Phytopathology*, **50**, 9, p. 628, 1960.

The opt. pH for growth of *T. basicola* [**39**, 316] on solid or liquid media was 4·7–5·5 at 21° C. but the root systems of young *Euphorbia pulcherrima* and bean (*Phaseolus vulgaris*) plants were destroyed in inoculated neutral or alkaline soils, though they escaped infection at pH 5·5 or lower. Bean was equally susceptible at all levels (4·7–8) in inoculated sterilized soil. At pH 4·7 only $\frac{1}{10}$ of the original *T. basicola* added to unsterile soil remained after 1 month in the absence of a host, but at pH 8 no decrease in the population was detected.

Lingappa (B. T.) & Lockwood (J. L.). **Fungistatic effects of lignin, lignin monomers, and model substances.**—Abs. in *Phytopathology*, **50**, 9, p. 644, 1960.

The fungistatic influence of soil on spores of *Glomerella cingulata* and other test fungi was unaffected by carboxylic acids, amino acids, sugars, and polyglycols, but was reversed by 0·05% peptone. Ethanol or dioxane extracts of washed, defatted soil contained lignin-type substances that inhibited germination of [unspecified] conidia at 60–80 μg. ml. Spruce lignin, lignin model substances, and monomers prevented germination at 100–150 μg./ml. It is concluded that lignin residues are involved in the inhibition of spore germination in soil.

Lingappa (Yamuna) & Lockwood (J. L.). **Superior media for isolation of actinomycetes from soil.**—Abs. in *Phytopathology*, **50**, 9, p. 644, 1960.

When diluted soil suspensions were plated on a mineral salts–agar medium containing 2·5 g. colloidal chitin l., numerous actinomycete colonies developed, with few bacteria and fungi. The growth of spp. of several genera was good on slants of the same medium. Water agar, though less effective, was also useful as a selective medium.

Vasil'kov (B. P.). Грибы. [Fungi.]—96 pp., 40 col. pl., Moscow, Ministry of Agric., 1959. Roubles 5.

This is a popular album of 61 spp. of edible and poisonous fungi commonly occurring in the Soviet Union. Indexes of the Latin and Russian fungus names are provided.

Kharkevich (G. S.). Мікофлора деревних і чагарникових порід Сталінської області. [The mycoflora of trees and shrubs of the Stalino region.]—*J. Bot. Acad. Sci. Ukr.*, **16**, 3, pp. 72–81, 1959. [Russ., Engl. summ.]

These are the results of investigations in 1949–51 of forest ranges and nurseries, the Belgorod-Don reserve, collective and state farm forest strips, and railway plantings. Listed are 323 spp. (58 ascomycetes, 27 basidiomycetes, and 238 fungi imperfecti) on 72 hosts. *Clasterosporium carpophilum* [map 188] was found on apricot, *Cerasus fruticosus*, and plum.

Melik-Khachatryan (D. G.). Новые для Армении виды грибов. [Species of fungi new for Armenia.]—Изв. Акад. Наук Армян. ССР [*Izv. Akad. Nauk Armyan. S.S.R.*], biol. Sci., **12**, 9, pp. 57–71, 1959. [Arm. summ. 20 ref.]

This annotated list from the Dept Bot., Erevan State Univ. [cf. below], gives 75 spp. and f. found during studies of the mycoflora of the forest areas of N.E. Armenia, including *Olpidium brassicae* on *Brassica oleracea*, *Pythium debaryanum* on the root collar of tobacco seedlings, *Tilletia secalis* [*T. caries*] on rye, *Ustilago*

avenae on *Avena* sp., *Ascochyta nicotianae* on tobacco, and *A.* [*Didymella*] *lycopersici* on tomato [map 324].

Simonyan (S. A.). Новые материалы по микофлоре Армении. [New materials for the mycoflora of Armenia.]—Изв. Акад. Наук Армян. ССР [*Izv. Akad. Nauk Armyan. S.S.R.*], biol. Sci., **12**, 10, pp. 23–31, 1959. [Arm. summ. 21 ref.]

This is a list of 83 spp. based on collections in the Bot. Gdn, Acad. Sci., Armenian S.S.R., and forays to various regions of Armenia in 1952–55 and 1958 [cf. above]. Included are *Pleospora papaveracea* on oriental poppy (*Papaver orientale*), *Didymella exigua* on stalks of *Dianthus*, *Cronartium flaccidum* on *Paeonia*, *Puccinia asparagi* on *Asparagus verticillatus*, *Alternaria dianthi* on *Dianthus*, and *Helminthosporium* [*Pyrenophora*] *teres* on barley.

Simonyan (S. A.). Мучнисто-росяные грибы **(Erysiphaceae)** Армянской ССР (Часть I). [Powdery mildews (Erysiphaceae) of the Armenian S.S.R. (Part I)] —Труд. Бот. Инст. Акад. Наук Армян. ССР [*Trud. bot. Inst. Akad. Nauk Armyan. S.S.R.*], *1959*, 12, pp. 93–148, 1959.

This is the 1st part of a study of the Erysiphaceae in Armenia based on materials collected in 1952–54 and from herbaria. There are keys to the gen. and spp. of *Sphaerotheca*, *Podosphaera*, and *Erysiphe*. Descriptive notes with hosts and collection sites are given for each sp. Included are *Sphaerotheca pannosa* var. *persicae* on peach, which is especially serious in the Mergino region, *Erysiphe graminis* f. *tritici* on wheat and *Triticum* spp., extremely harmful in low-lying areas, *E. cichoracearum* f. *nicotianae* on tobacco, widespread in the tobacco growing regions and causing appreciable damage in some years, and *E. cichoracearum* f. *cucurbitacearum* on melon, which causes great damage to cucurbit crops.

Sparrow (F. K.). **Aquatic phycomycetes. Second revised and enlarged edition.**— xxv+1187 pp., 1 pl., 91 fig., Ann Arbor, Univ. Michigan Press, 1960. $22·50. [60 pp. ref.]

This work has been enlarged [cf. **22**, 327] by the addition of about 55 gen. not previously considered; included are spp. of *Physoderma* parasitic on aquatic plants, *Coelomomyces*, the Saprolegniales, Pythiaceae (a descriptive key to *Pythium* and descriptions of 4 spp. of *Phytophthora* reported from aquatic habitats), and *Ancylistes*; the remaining text has been brought up to date (1957) by the incorporation of new taxa reported since the 1st edition.

Seeliger (H. P. R.). **Advances in the serology of fungi.** –*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 543–555, 1 pl. (2 fig.), 1960. [39 ref.]

Following a brief review and critical discussion of serological methods applicable to fungi, serological studies with yeasts are described to illustrate the application of these methods to elucidate taxonomic relationships of fungi.

Jarvis (W. R.). **An apparatus for studying hygroscopic responses in fungal conidiophores.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 525–528, 1 pl., 1 fig., 1960.

At the Scottish hort. Res. Inst., Invergowrie, Dundee, the behaviour of fungus cultures in atmospheres of various R.H. was observed by use of an apparatus consisting of a 6-in. diam. perspex cylinder divided vertically into 8 compartments in which R.H. may be maintained by glycerol solutions of various concs. The fungi were on agar or on leaf disks floating in mannitol solutions in shallow perspex pans ($\frac{3}{4}$ in. diam.) mounted between the spokes of a wheel-like structure at the top of the cylinder, the whole covered by a lid with a hole above each pan sealed with a cover glass for microscopic observation. The effect of change of R.H. can be observed by merely rotating the wheel without exposure to external air. The wheel may also

be turned upside down to bring the pans over cover glasses, supported on detachable perspex columns, to collect released spores.

It was confirmed that vigorous hygroscopic movements of *Botrytis cinerea* conidiophores occur with changes of 5% R.H. within the range 65–85% [**37**, 698].

Robson (June). **Autoradiography of water-soluble compounds in fungi.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 541–542, 1 pl. (2 fig.), 1960.

Details are given of a method used at the Isotope Res. Div., Atomic Energy Res. Establishment, Harwell, whereby fungi containing water-soluble radioactive materials were freeze-dried, embedded in parawax, and sections of approx. 3 μ cut on a microtome. These were de-waxed with xylol and filmed with A.R.10 stripping film in chloroform at 0° C.

Bell (A. A.). **Partial purification of self-inhibitors of germination from uredospores of Uromyces phaseoli var. typica.**—Abs. in *Phytopathology*, **50**, 9, p. 629, 1960.

A method is described for obtaining a self-inhibitory substance, active at 2 p.p.m., from uredospores of *U.p.* var. *typica* [*U. appendiculatus*: **38**, 307] by means of paper chromatography.

Moorhead (Ellen L.). **The antigenic analysis of extracts from healthy plants.**—Abs. in *Phytopathology*, **50**, 9, pp. 646–647, 1960.

Rabbits were immunized with sap preparations from 6 plant spp., purified as described for virus antigens [cf. **38**, 504; **39**, 420]. Cross reactions among the plant antigens were measured by complement fixation, Ouchterlony and Oudin agar diffusion, and immuno-electrophoresis. Maize antigen reacted with maize, wheat, barley, and tobacco antisera, and squash antigen with squash, wheat, barley, and tobacco antisera.

Klinkowski (M.). **Choroby wirusowe roślin uprawnych. Referat wygłoszony dn. 3. vi. 1959 r. w Min. Rolnictwa.** [Virus diseases of cultivated plants. A report made at the Ministry of Agriculture, Warsaw, on 3 June, 1959.]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, 8, pp. 27–54, 1960. [Russ., Engl. summ. Cyclostyled.]

A general review of viroses, including a survey of their history, symptomatology, use of the electron microscope, modes of transmission, identification by means of test plants, the use of serological methods, prevention, and the prospects of heat therapy.

Cornuet (P.). **Maladies à virus des plantes cultivées et méthodes de lutte.** [Virus diseases of cultivated plants and control methods.]—440 pp., 41 pl., 2 graphs, Paris, Institut National de la Recherche Agronomique, 1959 (publ. 1960). 35 N.F. [665 ref.]

In this work, to which P. Limasset contributes a preface, the available information on the chief virus diseases of crop plants is summarized. After an introduction dealing with virus diseases and their control in general the diseases are listed in the 1st part (pp. 35–358) under the common names of the hosts arranged in botanical order, separate chapt. being devoted to large-scale crops and market-garden plants, fruit trees and vine, and flowers and ornamentals, with bibliographies concluding each main sect. The aspects of each disease dealt with in this part include economic importance, symptoms, effect of climatic factors, biochemical changes, transmission and spread, diagnosis, and control. In the 2nd part brief notes (synonyms, transmission, susceptible hosts, both cultivated and otherwise, and properties) are given on viruses present in France or likely to be found there (under French common names) and on those not likely to be found in Europe (English common names),

with relevant references. In conclusion, there are lists of seed- and soil-borne viruses, a classification of viruses into 3 main groups according to host range, subdivided according to the means of transmission, and a concluding index of plant names, both common and Latin.

SOMMEREYNS (G.). **Les conséquences de l'action de certains dérivés puriques et pyrimidiques sur la multiplication des virus végétaux.** [The consequences of the action of some purine and pyrimidine analogues on the multiplication of plant viruses.]—*Meded. LandbHogesch. Gent*, **24**, 3–4, pp. 779–790, 1959. [Engl. summ. 37 ref.]

Studies at the Lab. Phytovirologie, Gembloux, Belgium, showed that ribonucleic acids appear to play an important part in the multiplication of plant viruses. Certain purine and pyrimidine analogues, different from those normally present in nucleic acids, can be incorporated into these substances and their presence can then disturb the synthesis of new virus particles. The therapeutic application of this is discussed.

PROTSENKO (A. E.). **Electron microscopy of the Aster yellows virus (Leptomotropus callistephi Ryzhkov).**—*Biol. Plant. Acad. sci. bohemosl.*, **1**, 3, pp. 187–191, 1959. [Czech, Russ. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 16, pp. 50–51, 1960.]

Spherical multi-grained particles 30–50 mμ diam. were found in sap from tissues of a variety of plants infected by aster yellows virus [**38**, 192] and in the tissue of *Cuscuta europea*, by which the virus was transferred from *Cirsium arvense* to *Petunia hybrida*. These are thought to be virospores.

MCLEAN (D. M.). **Diseases caused by Tobacco ringspot virus in the lower Rio Grande valley of Texas.**—*Plant Dis. Reptr*, **44**, 9, pp. 738–741, 1960.

From a comparison of symptoms of tobacco ring spot virus (TRSV) [cf. **38**, 441] on field- and greenhouse-inoculated plants of 18 economic hosts at Tex. agric. Exp. Sta., Weslaco, and serological reactions and indexing, it is concluded that eggplant yellows [**30**, 449], watermelon pimples [**33**, 66], cantaloupe mosaic [cf. **29**, 135], bean (*Phaseolus vulgaris*) top necrosis [**40**, 137], and soybean bud blight [**25**, 484; **39**, 363] in this area are all caused by a yellow str. of TRSV.

THRESH (J. M.) & TINSLEY (T. W.). **The virus complex causing swollen shoot disease of Cacao in West Africa.**—*F.A.O. Plant Prot. Bull.*, **8**, 6, pp. 65–69, 2 fig., 1960.

A study of over 100 W. African isolates of cacao swollen shoot virus [**39**, 96; **40**, 33, 94] showed that they differ in both type and severity of symptoms induced in cacao seedlings when derived from widely different areas, but differ only in severity when from the same locality. There is no information on the properties of the strs. that make up the swollen shoot complex *in vitro* and attempts to produce antisera have been unsuccessful. Isolates may be classified on the basis of vector specificity but sufficient work has not been done on this aspect to make standardization possible. The host range approach is limited as only a few isolates have been tested for their ability to infect 3 key spp.

At present protection tests provide the only reliable criteria for distinguishing and grouping the isolates. Those within a group inter-protect, cause symptoms of a similar type, and do not have cumulative effects on growth, whereas the reverse is true of those in different groups.

TURNER (P. D.) & WHARTON (A. L.). **Leaf and stem infections of Theobroma cacao L. in West Africa, caused by Phytophthora palmivora (Butl.) Butl.**—*Trop. Agriculture, Trin.*, **37**, 4, pp. 321–324, 2 fig., 1960.

This information from Ghana has been noted [**40**, 33]. Similar symptoms have been

reported from Nigeria, Fernando Po, and Cameroun [French Cameroons]. These infections are of local importance only and may be due to either of the 2 complementary strs. of the pathogen [**39**, 685]. The symptoms [**37**, 220] are characteristic and identical in all the areas.

Hansen (A. J.). **The selective effect of the antibiotic pimaricine upon growth of several Cacao fungi in vitro.**—Abs. in *Phytopathology*, **50**, 9, p. 638, 1960.

The growth of *Ceratostomella* [*Ceratocystis*] *fimbriata*, *Colletotrichum gloeosporioides* [*Glomerella cingulata*], *Diplodia* [*Botryodiplodia*] *theobromae*, *Pestalotia* sp., and *Fusarium* sp. on potato dextrose agar was inhibited by 50–200 p.p.m. pimaricin [**40**, 80], but not that of *Phytophthora palmivora*, which developed slowly even at 2,000 p.p.m. The antibiotic should be of use in suppressing contaminating fungi during the isolation of *P. palmivora*.

Roane (C. W.). **New or unusual diseases of cereal crops in Virginia.**—*Plant Dis. Reptr*, **44**, 9, p. 696, 1960.

New records for Va are *Sclerospora macrospora* [map 287] on maize in 1958 and soil-borne oat mosaic virus [cf. **38**, 193] in 1959.

Progressive Wheat production.—338 pp., 160 fig. (40 col.), 15 graphs, 22 maps, Geneva, Centre d'Étude de l'Azote, 1960.

Part I (pp. 1–123) deals with the social and economic importance of wheat, its botany and breeding, culture [Germ., with Engl. summ.], and the physiological bases for its nutrition and fertilization [Fr., with Engl. summ.] On pp. 56–61 there are notes on breeding for resistance to diseases, with reference to *Puccinia graminis*, *P. glumarum* [*P. striiformis*], *P. rubigo-vera tritici* [*P. recondita*], *Erysiphe graminis*, *Tilletia* spp., *Ophiobolus graminis*, *Cercosporella herpotrichoides*, *Xanthomonas translucens*, and *Septoria nodorum*.

In Part II (pp. 126–338) special features of wheat cultivation in the main producing countries, grouped into 9 major geographical areas, are outlined; production, varieties, cultural practices, fertilizers, pests and diseases, and research institutes in each are described.

The most widely prevalent and destructive wheat diseases are the rusts [cf. map 97], which are listed as serious under almost every country. *T. caries* [294], *T. foetida* [295], *Ustilago nuda* [368], and *Urocystis tritici* [*U. agropyri*: 80] are also world-wide in distribution. *T. contraversa* [297] is severe in many European countries. *C. herpotrichoides* [74] is particularly severe in Germany, Switzerland, Great Britain, and U.S.A., and *O. graminis* in most European countries, Canada, Brazil, Kenya, and New Zealand. *E. graminis* is economically serious in Norway, Great Britain, Hungary, U.S.A., the Far East, and Australasia. *Septoria nodorum* [283] and *S. tritici* are serious in Norway, Switzerland, Yugoslavia, U.S.A., Brazil, Pakistan, China, Kenya, and S. Africa. In Canada and the U.S.A. wheat streak mosaic virus is of economic importance. *Gibberella saubinettii* [*G. zeae*] causes losses in China, Japan, and S. Korea.

Garrett (W. N.) & Wilcoxson (R. D.). **Fertilization of pycnia with urediospores in Puccinia graminis var. tritici.** -Abs. in *Phytopathology*, **50**, 9, p. 636, 1960.

When uredospores of 9 races of *P. graminis* were applied to 319 pycnia, 82 clusters of aecidia were formed [**40**, 37], whereas aecidiospores on 63 pycnia gave 20 clusters. Germination of uredospores was only 7% in pycnial nectar, but 85% in distilled water. Race 15B uredospores had the highest germination rate. Fusions were observed between uredospore germ tubes and flexuous hyphae outside the pycnia.

GARRETT (W. N.). **Production of new races of Puccinia graminis var. tritici by tissue transplants.**—Abs. in *Phytopathology*, **50**, 9, p. 636, 1960.

New races of *P. graminis* [**39**, 17], 2 of them pathogenically unlike any previously known, were obtained by transplanting mycelia of races 11 and 121 in host tissue (Little Club wheat) to a common host plant or by inoculating with mixtures of uredospores.

MILLER (C. W.) & HART (HELEN). **Variability in stem rust reactions of Kubanka Wheat with light intensity and temperature.**—Abs. in *Phytopathology*, **50**, 9, pp. 645–646, 1960.

Light of 100 ft-candles was insufficient for good sporulation by races 11 and 56 of stem rust [*Puccinia graminis*] at 85° F. and by races 32 and 48A at 65–75°, but 1,500 ft.-candles was adequate for the former 2 at 65–85° and for the latter at 75–85°. Within a population of Kubanka, reactions to races 11 and 56 were susceptible, to 48A mesothetic-susceptible, and to 32 mesothetic, susceptible, or resistant, according to the environment.

JENSEN (S. G.) & DALY (J. M.). **Some effects of the chemotherapeutant $NiCl_2$ on the physiological and morphological development of rust-infected Wheat plants.**—Abs. in *Phytopathology*, **50**, 9, pp. 640–641, 1960.

Sporulation of *Puccinia graminis* race 56 on Little Club wheat was suppressed by $NiCl_2$ (100 p.p.m. Ni) [cf. **38**, 506]. Any spores that developed were reduced in viability and abnormal. The principal effect appears to be in maintaining a high ratio, respiratory response varying with the stage of metabolic development at application. When applied to healthy wheat $NiCl_2$ stimulated respiration and increased the C_6/C_1 ratio.

MATHER (S. C.) & HANSING (E. D.). **Root and shoot development of Wheat infected with loose smut, Ustilago tritici.**—Abs. in *Phytopathology*, **50**, 9, p. 645, 1960.

Bison wheat plants infected by *U. tritici* [*U. nuda*] had 23% fewer roots than healthy plants and their total dry wt. was 32% less. Shoots were reduced in height by 13%, tillers were 11% fewer, and total dry wt. was 34% less. The shoot root ratio was similar for both smutted and healthy plants.

ENIKEEV (M. G.). Оздоровление семян Пшеницы, снизивших всхожесть. [Disinfection of Wheat seed having low germination.]—*Земледелие* [*Zemledelie*], **8**, 3, pp. 86–87, 1960.

In laboratory and field in 1957–59 at the Omsk agric. Inst. and elsewhere it was found that mono- and diphase heat treatment of Caesium III and Mildurum 553 wheat seed reduced growth energy and germination, but subsequent dusting with granosan (1 g./kg.) gave considerable improvement. Granosan after monophase heat treatment also considerably increased yield and gave better control of loose smut [*Ustilago nuda*: **40**, 99] than the heat alone.

WITKOWSKI (W.) & WITKOWSKA (DANUTA). **Porównanie skuteczności działania krajowej zaprawy fungitox OR z zaprawami zagranicznymi przeciwko śnieci cuchnącej Pszenicy (Tilletia tritici Wint.).** [A comparison of the Polish chemical fungitox OR with foreign chemicals for effectiveness against stinking smut (*T. tritici*).]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, pp. 179–190, 1960. [Russ., Engl. summ. Cyclostyled.]

At Inst. Plant Prot., Puławy, Poland, seed treatment of winter wheat var. Puławska Wczesna against *T. tritici* [*T. caries*: **39**, 405] with fungitox OR and 6 other fungicides gave similar results (0·03–1·17% infection compared with up to 60% in the untreated).

KENDRICK (E. L.). **A solopathogenic line of Tilletia caries.**—Abs. in *Phytopathology*, **50**, 9, p. 641, 1960.

Teleutospores produced in a monosporidial culture (392–1) of *T. caries* race T-16 gave secondary sporidia which failed to mate with either + or — haploid sporidia. The sporidia, which were uninucleate except at budding, caused a high rate of infection on wound-inoculated young wheat seedlings [cf. **38**, 140].

KENDRICK (E. L.) & HOLTON (C. S.). **Compatability relationships between monosporidial isolates of Tilletia caries and T. contraversa.**—Abs. in *Phytopathology*, **50**, 9, p. 641, 1960.

Of 16 monosporidial isolates of *T. contraversa*, 5 produced sporidia but no fusions occurred between these. All 5, however, fused with both + and — lines of *T. caries* [cf. above], the fusion and infection percentages indicating that they were more strongly — than + in reaction.

ASHWORTH (L. J.), LAHR (K. A.), & COLLINS (R. J.). **Pathogenic specialization of Helminthosporium sativum.**—Abs. in *Phytopathology*, **50**, 9, p. 627, 1960.

The differential susceptibility of Westar wheat, Combine 7078 sorghum, and 2 oat vars. to single-spore cultures of *H. sativum* [*Cochliobolus sativus*: **39**, 293] was examined by sowing in sterile soil infested with 0·2% ground-infected oat seed (controls contained similar amounts of sterilized seed) and comparing counts and dry wt. of the plants. Eleven isolates from wheat were classified into 6 pathogenic groups. Alamo oat was more susceptible than New Nortex; wheat and sorghum were susceptible to some clones and resistant to others. The results suggest a reason for the differences in severity of wheat root rot when wheat is rotated with some oat and sorghum vars.

BOOSALIS (M. G.). **The effect of nutrition on germination of conidia of Helminthosporium sativum in natural soil.**—Abs. in *Phytopathology*, **50**, 9, p. 629, 1950.

A sandy loam soil from a field of winter wheat was infested with conidia of *H. sativum* [*Cochliobolus sativus*] from wheat [cf. above] and left for 3 weeks. On addition of potato dextrose broth to a sample of the soil and incubation for 24 hr. at 25° C. 75% of the conidia germinated, 50% of these forming unbranched germ tubes bearing single viable conidia at the tip. A few conidia germinated in this way in soil amended with dextrose broth; none germinated when only water was added.

COÏC (Y.) & LEFEBVRE (J.-M.). **Perspectives de déficience en soufre dans l'agriculture française. Carence en soufre du Blé d'hiver.** [Prospects of sulphur deficiency in French agriculture. Sulphur deficiency in winter Wheat.]—*C. R. Acad. Agric. Fr.*, **46**, 7, pp. 436–441, 1960.

Symptoms of sulphur deficiency in Capelle wheat in pot culture appeared as soon as active growth began. At the tips of the oldest leaves pigmentation disappeared, the cells died, and this part became a chestnut or 'tobacco' colour. The plant as a whole was a paler green than normal. Growth and ear formation were reduced, but the ear-bearing stems appeared to be normal; after flowering no symptoms of S deficiency were apparent except by comparison with control plants, though the deficiency became apparent in the amount of grain that formed later.

MCKINNEY (H. H.) & GREELEY (L. W.). **Several unique strains of the Barley stripe mosaic virus.**—*Plant Dis. Reptr*, **44**, 9, pp. 752–753, 1960.

At U.S. Dept Agric., Beltsville, Md, dilution transfer and selection of 14 isolates of this virus [**36**, 237; **39**, 566 and below] enabled the distinction on 5 cereal indicator vars. of 6 plant reaction types (tabulated) which differed from the normal chlorotic

striping and mosaic to be made. Only 2 isolates were not seed-borne. A latent str. in wheat and barley, from which other strs. were derived, protected against re-infection by all strs. These very divergent isolates appear nevertheless to be closely related.

KANKAM (J. S.) & ARNY (D. C.). **Effect of temperature on concentration of Barley stripe mosaic virus in susceptible and tolerant varieties.**—Abs. in *Phytopathology*, **50**, 9, p. 641, 1960.

In greenhouse trials the conc. of barley stripe mosaic virus [cf. above] in barley as determined with *Chenopodium amaranticolor* as local lesion host was found to be greatly influenced by air temp., symptoms appearing earlier and being more severe at 24° than at 16° C.

MORTON (D. J.). **A seedling test for detecting viable Ustilago nuda mycelium following Barley seed treatments.** -Abs. in *Phytopathology*, **50**, 9, p. 647, 1960.

Barley seed treated with a surface protectant [cf. below] was sown 1 in. deep in flats in the greenhouse and the seedlings harvested at the 2nd true-leaf stage by hosing off the soil. Crown node areas were cut out and boiled in 5% NaOH for 20 min. to remove the coleoptile sheaths, cleared by boiling in lactophenol for 15 min., and mounted in glycerine, when mycelium is visible under the low-power objective. The mycelium may be stained by 0·005% trypan blue in the lactophenol [cf. **39**, 692; **40**, 41, 100].

MORTON (D. J.), HAGEN (I. K.), & TOOL (E.). **An improved method of disinfecting Barley seed of Ustilago nuda.**—*Plant Dis. Reptr*, **44**, 9, pp. 724–727, 1 fig., 1960. [12 ref.]

A description is given of a 55-gal. drum fitted with a false bottom and converted to a seed treater [cf. **36**, 238] at the N. Dak. agric. Exp. Sta, Fargo. The drum is filled ¾ full with barley seed, water at 70° F. added, and the grain soaked for 2–4 hr. Excess water is then drained off and the drum sealed for 65–70 hr. with a plastic sheet secured over the top with elastic. Finally, an air blower is connected to the bottom of the drum and the grain dried to about 14% moisture content. This procedure gave good control of *U. nuda* without affecting germinability.

KLINE (D. M.). **Induced color mutants in Rhyncosporium secalis. Variation in pathogenicity in Rhyncosporium secalis.**—Abs. in *Phytopathology*, **50**, 9, p. 642, 1960.

Exposure of spores of 16 pathogenic biotypes of *R. secalis* [**39**, 300] to UV irradiation produced 80 colour mutants differing in culture from the wild-type biotypes. On inoculation of [barley] vars. susceptible to the original source biotypes only 45 of the mutants were pathogenic.

The 2nd abs. reports that distinct pathogenic biotypes were demonstrated among 44 isolates of *R. secalis* from 5 S.E. States in inoculation tests on 35 winter barley vars.

BROWNING (J. A.). **Altering the effect of Oat rust resistance genes by certain physical means. Induced susceptibility of Wheat and Barley to Oat crown and stem rust fungi.**—Abs. in *Phytopathology*, **50**, 9, p. 630, 1960.

Leaves of oat vars. with combinations of the resistance genes A, B, and D became susceptible to races 6, 7, 7A, and/or 8 of *Puccinia graminis* [**38**, 1] when scalded or detached 1–9 days after inoculation and placed in water or 2% sucrose [cf. **39**, 564]. Similarly treated leaves of Victoria, Bondvic, Trispernia, C.I. 2923, Santa Fe, Ukraine, and Landhafer oats became susceptible to races 202, 258, and/or 290 or *P. coronata*. When oat plants normally resistant to races 7 and 8 of *P. graminis* and race 202 of *P. coronata* were severed at the 2nd node and placed on

water 1 day after inoculation, susceptible-type sori developed as long as the plants were root-free.

In similar experiments with 10 wheat and 13 barley vars., normally immune from or highly resistant to *P.g.* [f.sp.] *avenae* and *P. coronata*, the former induced intermediate to very large uredia and or telia on detached barley leaves and small to large sori on wheat, while the latter caused intermediate-type sori on barley and resistant ones on wheat.

HOBBS (E. L.). **Factors affecting germinability of urediospores of Puccinia coronata.** —Abs. in *Phytopathology*, **50**, 9, p. 639, 1960.

Spores produced on oats at 61° F. had higher germination percentages and longer storage life than those produced at 72° and 85° F. Germination tended to rise to a max. in 11-day-old uredia. Wilting of the plants before spore collection reduced germinability, but further watering reversed this effect. Germination was unaffected by the varietal susceptibility of the host.

GORE (U. R.) & LUTTRELL (E. S.). **Effect of seed quality, seed treatment, and planting date on stands and yields of Oats.** *Circ. Ga agric. Exp. Sta.*, N.S., 14, 11 pp., 1960. [13 ref.]

In field experiments from 1955–58 earlier planting (for forage production) progressively increased mortality from *Helminthosporium* [*Cochliobolus*] *victoriae* [**39**, 568] in Victorgrain 48-93 oats, especially when infected seed was used. Seed treatment of infected seed doubled such stands and their yield, but better results were obtained with clean seed than by treating poor seed. Seed quality, seed treatment, and planting date had no consistent effect on grain production if forage clipping was finished on 1 Mar.

BERRY (R. W.) & FUTRELL (M. C.). **Toxin production by Helminthosporium victoriae on synthetic media containing different nitrogen sources.**—Abs. in *Phytopathology*, **50**, 9, p. 629, 1960.

There were significant differences in the amount of toxin produced by a single spore culture of *H.* [*Cochliobolus*] *victoriae* [**39**, 696; **40**, 43] when 7 different N sources were used. A toxin affecting Alamo [oat] seedlings was favoured by NH_3NO_4 and another active against New Nortex by methionine.

LINDBERG (G. D.). **Transmission of a disease of Helminthosporium victoriae.**—Abs. in *Phytopathology*, **50**, 9, p. 644, 1960.

The agent causing the disease of *H.* [*Cochliobolus*] *victoriae* [**40**, 43] is transmitted through anastomosing hyphae. Centrifuged preparations infectious to *C. victoriae* contained viable hyphal fragments; clarified 'sap' passed through medium glass filters had no viable fragments and was not infectious. Growth of a non-sporulating mutant of *C. victoriae* carrying the agent was not inhibited. Transmission was infrequent between distinct isolates of *C. victoriae* but 100% among cultures from a single isolate.

WERNHAM (C. G.). **Maize synthetics for disease resistance.** *–Plant Dis. Reptr*, **44**, 7, pp. 498–500, 1960.

So far only 6 synthetic maize vars. have been produced specifically for disease resistance, 3 from Pa agric. Exp. Sta., University Park [**32**, 619], 2 from Purdue, and 1 from Cereal Crops Div., U.S.D.A. The author discusses the development and advantages of such vars. Four new vars. (S_3–S_6) have been produced which had outstanding resistance to *Helminthosporium turcicum* [**39**, 699] in a severe nursery epidemic in 1958.

Vágás (E.) & Maácz (G. J.). **A quick method for staining the hyphae of Ustilago maydis.**—*Stain Tech.*, **35**, 4, pp. 220–222, 1960.

The material is fixed in formol, embedded in paraffin for 24–48 hr., and sectioned with a sledge microtome by Rydberg's adhesive cellophane folia method (*Z. wiss. Mikr.*, **62**, p. 341, 1955). Removal of the paraffin and the adhesive is effected with trichloroethylene in 5 hr., a period which is reduced by half at 60° C. The hyphae are then stained for 1–3 min. in 1% safranin in distilled water, washed, and flooded with 2·5 g. aniline blue W.S., 25 ml. distilled water, and 100 ml. saturated aqueous picric acid, heated over a flame until simmering begins, the excess stain poured off, and the slide cooled before washing. Differentiation for 1 min. in 1% aqueous NaOH imparts a brick-red colour to the sections; washing in water then 3 times in 96% alcohol or acetone leaches excess stain. After dehydration with phenol-xylene (1:3) the section resumes its original bluish tinge. The phenol-xylene is removed in 2–3 changes of benzene or xylene before mounting in balsam.

The cellulose cell walls of the parenchyma, the nucleus, and the cytoplasm stain various shades of light blue, while the nucleolus and cell elements with walls not yet altogether lignified and disorganized by the smut are red. The dark violet hyphae stand out sharply from the pale ground tissue and are easily discernible in the more vividly stained xylem.

Wilcoxson (R. D.) & Covey (R. P.). **The relationship between Corn plant populations and smut infection.**—*Agron. J.*, **52**, 9, p. 545, 1960.

In field studies (1957–59) at Univ. Minn. plants or plant parts infected by smut (*Ustilago maydis*) [**37**, 534] were 2–16 times more prevalent in 1 plant hill plots of Hays White sweet corn and the inbred dent line B 164 than in 4 plants hill plots. In addition, infection was about 3 times more severe on the stalks of B 164 plants in the less dense populations than in the more thickly planted ones. Work with Hays White was discontinued after the 1st yr. as it tended to tiller.

Кеснек (N. A.). Новое в биологии пузырчатой головни Кукурузы. [New contributions to the biology of blister smut of Maize.]—Изв. Акад. Наук Армян. ССР [*Izv. Akad. Nauk Armyan. S.S.R.*], biol. Sci., **12**, 8, pp. 51–59, 5 fig., 1959. [Arm. summ.]

Only young growing tissues of maize are liable to infection by *Ustilago zeae* [*U. maydis*: **39**, 570]. Tests at Inst. Agric. Echmiadzin exp. Base showed that with infection through the coleoptile the mycelium ascends only to the 6th internode, the stalk alone is infected, and eventually the plant is killed. From observations in different parts of Armenia in 1958 it is concluded that in natural conditions wind-borne spores with soil, deposited in a drop of moisture on the surface of the maize plant, penetrate the plant organs through the growing point or leaf axils. Resistance of maize vars. depends, therefore, on the structure of the growing point, leaf axils, and ligules, and this should be taken into account when breeding resistant vars.

Kalashnikov (K. Y.). Устойчивость семян Кукурузы к плесневению. [The resistance of Maize seed to moulds.]—Кукуруза [*Kukuruza*], **5**, 9, pp. 38–39, 1960.

Climatic conditions of the N.W. regions of the non-chernozem zone of U.S.S.R. are especially favourable to the development of moulds on maize seed, notably *Penicillium*. Germination and shoot growth generally take place in conditions of excessive soil humidity and comparatively low temp., so that germination is retarded and initial growth slow. Seed treatment with chemicals, especially organic Hg preparations, gives good surface disinfection. Maize vars. with highest resistance were Voronezhskaya 76 and 80 (15 and 21% loss at 10° C.). Hybrids proved

more resistant than the parent plants: thus at 10° seed and seedling losses of Voronezhskaya 80 × Sterling were 9% and of Voronezhskaya 76 × Khar'kovskaya belaya zubovidnaya 10%. Further experiments confirmed the superiority of hybrid seed.

Jennings (P. R.) & Beachell (H. M.). **Hoja blanca disease of Rice found in Mexico.**—*Plant Dis. Reptr*, **44**, 9, p. 751, 1960.

In May 1960 hoja blanca virus [**40**, 45 *et passim*; map 359] was found for the 1st time in Mexico, on *Echinochloa colonum* and *Digitaria* sp., but not on rice, in a nursery at the Cotaxtla Exp. Sta. In Piedros Negras, Veracruz, 1 diseased rice plant of the native var. Jojutla was found, this rarity being attributed to the scarcity of the vector, *Sogata orizicola*.

Latterell (Frances M.), Tullis (E. C.), & Collier (J. W.). **Physiologic races of Piricularia oryzae Cav.**—*Plant Dis. Reptr*, **44**, 9, pp. 679–683, 1 fig., 1960.

At the U.S. Army Chemical Corps Biol. Labs., Fort Detrick, Frederick, Md, 15 physiologic races of *P. oryzae* [**38**, 257] were distinguished among 165 isolates from rice from all over the world, on the basis of their pathogenicity on 10 differential vars. It is concluded that *P. oryzae* is so similar morphologically to *P. grisea* on grasses that they should be considered as one taxon, and the rice blast fungus designated *P. grisea* f.sp. *oryzae*.

Oku (H.). **Biochemical studies on Cochliobolus miyabeanus. IV. Fungicidal action of polyphenols and the role of polyphenoloxidase of the fungus.**—*Phytopath. Z.*, **38**, 4, pp. 342–354, 9 graphs, 1960. [Germ. summ.]

In further studies at Takamine Lab., Sankyo Co. Ltd., Shinagawa, Tokyo [cf. **39**, 307], the toxicity of catechol to the mycelium of *C. miyabeanus* was diminished by the addition to the culture medium of Na-diethyldithiocarbamate, inhibitor of Cu-enzymes, and to spore germination by the addition of reducing agents such as ascorbic acid or glutathione. The brown substance derived from the oxidation of catechol by the polyphenoloxidase of *C. miyabeanus* is also toxic. The toxicity of catechol to spore germination did not increase with conc., nor did O uptake of polyphenoloxidase with increase in substrate conc. above a certain level. It is concluded that the fungicidal action of polyphenols depends on the oxidation product of the polyphenoloxidase. Thus *C. miyabeanus* is self-inhibitory in the polyphenol solution. The relations between the polyphenoloxidase of *C. miyabeanus* and the characteristics of rice leaf blight are discussed.

Al-Sohaily (I. A.) & Mankin (C. J.). **Method of chlamydospore germination of Sphacelotheca reiliana in soil. Races of head smut of Sorghum.**—Abs. in *Phytopathology*, **50**, 9, p. 627, 1960.

Chlamydospores from maize and sorghum [**39**, 468] were sprinkled on glass slides, covered with strips of water-permeable cellophane, and buried in soil at 15–75% water-holding capacity at 30° C. for 3–4 days. Percentage germination was low and long, branched hyphae, but no sporidia, were formed.

Field and greenhouse inoculation studies with collections of *S. reiliana* from sorghum and Sudan grass from Tex., N. Mex., Calif., and India suggested the occurrence of 3 or 4 physiologic races; 5 sorghum vars. were selected as differentials.

Wallace (J. M.) (Editor). **Citrus virus diseases.**—x+243 pp., 60 fig., 6 graphs, 1 map, Univ. Calif., Div. agric. Sci., 1959. $3·50.

Of the 35 papers (each with a list of ref.) by workers in the U.S.A. and elsewhere, 30 were presented at the Conference on Citrus Virus Diseases, Riverside, Calif., 18–22 Nov., 1957. The whole forms a valuable review of current ideas and

practices in relation to the major diseases of world citrus cultivation at the present time.

A short introduction on 'Citrus viruses, their economic importance and their modern methods of travel' is by L. C. Cochran. Surveys of a general nature were given by J. M. Wallace (psorosis), I. Reichert (viruses in the Mediterranean area [**39**, 577]), and F. Nour-Eldin (research in Egypt). Of the 10 papers on tristeza that by J. W. Wallace summed international co-operative investigations; P. C. J. Oberholzer gave a summary of host reactions in S. Africa; T. J. Grant described work on strains [**39**, 308]; L. C. Knorr compared the differences between N. and S. American tristeza [**36**, 317]; M. V. F. Valiela gave the present status in Argentina; and H. Schneider described the anatomy of infected trees [**38**, 3].

Lilian R. Fraser indicated the relation of seedling yellows to tristeza, while P. R. Desjardins *et al.* reported the separation of strs. from the tristeza-seedling yellows complex by heat; insect vectors were dealt with by R. C. Dickson & R. A. Flock and rootstocks in relation to control by W. P. Bitters. Papers on stubborn disease were given by J. B. Carpenter (investigations in U.S.A. [**37**, 477]) and H. Chapot (studies in some Mediterranean countries [**36**, 400]). J. F. L. Childs discussed the status of xyloporosis and cachexia and L. Amizet xyloporosis in Algeria, where the disease has appeared in a line of Wekiwa tangelo. Exocortis was dealt with by Lilian R. Fraser & E. C. Levitt (in Australia), L. C. Knorr & H. J. Reitz (Fla), and E. C. Calavan & L. G. Weathers (Calif.); S. Moreira described studies in Brazil on Rangpur lime disease and its relationship to exocortis [**36**, 317], and J. F. L. Childs *et al.* the laboratory diagnosis of infection in *Poncirus trifoliata* [**38**, 3]. Other diseases reported on were citrus vein enation (J. M. Wallace & R. J. Drake), a growth-retarding factor in Eureka lemon [**34**, 782] (E. C. Calavan & L. G. Weathers), and a bud union disorder of calamondin in Calif. (L. G. Weathers & E. C. Calavan). E. O. Olson discussed symptomless carriers and their role in the spread of citrus viruses. Of 2 papers on nucellar embryony that by J. W. Cameron *et al.* concerned its horticultural significance and that by L. G. Weathers & E. C. Calavan a means of freeing citrus clones from viruses. J. M. Wallace & R. J. Drake outlined an indexing programme to avoid viruses in citrus introduced into the U.S.A. Papers on virus-free budwood production and certification came from Calif. (W. Reuther, W. F. Hiltabran), Texas (B. Sleeth), Fla (G. G. Norman), and Ariz. (R. B. Streets).

Tsao (P. H.) & Garber (M. J.). **Methods of soil infestation, watering, and assessing the degree of root infection for greenhouse in situ ecological studies with Citrus Phytophthoras.**—*Plant Dis. Reptr*, **44**, 9, pp. 710–715, 2 fig., 2 graphs, 1960.

In further work at Dept Plant Path., Univ. Calif., Riverside [cf. **38**, 4], suitable inocula for infesting soil in pot experiments on 2–3-month-old sweet orange seedlings were provided by mycelia of *P. citrophthora* and *P. parasitica* [**39**, 105] grown in liquid media, washed, macerated, and mixed with sterile coarse sand. Periodic water-logging of the pots, induced by placing them in clay saucers filled with water, increased both normal root growth of the seedlings [cf. **39**, 704] and the severity of infection in infested soil. The degree of root infection in short-term greenhouse experiments was assessed quickly and accurately by counting healthy root tips.

Eckert (J. W.) & Kolbezen (M. J.). **Evaluation of ammonia-generating formulations for control of Citrus fruit decay.**—Abs. in *Phytopathology*, **50**, 9, p. 634, 1960.

The best control of *Penicillium digitatum* on oranges in closed fibre-board containers was given by $(NH_4)_2SO_4$—$Ca(OH)_2$-impregnated sheets [cf. **39**, 411], which released a relatively large amount of ammonia at R.H. 85%. Sheets gave a better distribution of ammonia than tablet mats.

RAYNER (R. W.). **Rust disease of Coffee. I. Nature of the disease. 2. Spread of the disease. 3. Resistance. 4. Control by fungicide.**—*World Crops*, **12**, 5, pp. 187–190, 5 fig.; 6, pp. 222–224, 4 fig., 1 map; 7, pp. 261–264, 4 fig.; 8, pp. 309–312, 3 fig., 1960. [18 ref.]

The 1st paper of this comprehensive summary deals with the symptoms of coffee rust (*Hemileia vastatrix*), the damage caused, spore dispersal, the conditions required for germination, the part played by water, the incubation period, and the relation of rainfall to incidence in the field [**39**, 579; **40**, 106]. In the 2nd the possible threat to N. and S. America [cf. **37**, 354] is discussed. In the 3rd an account is given of the work done in different countries, including S. India, Kenya, and Portugal [**39**, 707], on the development of resistant vars. The last paper gives the results of work on fungicidal control in S. India [**39**, 411] and describes recent investigations on the subject in Kenya [**29**, 412 and below], which are summarized with some additional conclusions. Cu sprays had effects on leaf shedding not shared by captan, a strong point in favour of Cu. To secure the same degree of control as that given by hand-spraying using 2% and 2 pints tree, an air-blast machine with a swirl-plate nozzle applying 100 gal. acre at 8% conc. should be used or one with a spinning cage giving 30 gal./acre at 7½%.

[The 1st 3 of these papers also appear in *Plant. Chron.*, **55**, 13, pp. 305–307; 18, pp. 434–435; 20, pp. 474–476, 1960.]

HANGER (B. F.) & FIRMAN (I. D.). **Resistant varieties of Coffee in relation to physiologic races of Hemileia vastatrix in Kenya.**—*Kenya Coffee*, **25**, 294, pp. 210–211, 219, 1960.

In Kenya up to 5 applications a year of Cu or other fungicides may be required to control coffee rust (*H. vastatrix*) [see above and below], and at least 10 lb. of a 50% Cu fungicide 100 gal. water are necessary acre/application. The most widely distributed race of *H. vastatrix* in Kenya is race II [cf. **38**, 693], but the damage caused by premature defoliation above 6,000 ft. is usually less than that at lower levels. Race I is known to be present only at low altitudes, in warm, humid conditions. Race VII [**39**, 707] occurs with race I. Vars. proved at the Coffee Res. Sta. to be immune from race II are: K7; S.L.6; K.P.532; Kents; S.288, 333, and 795; and B.A.8, 10, 16, 35, and 36. Observations during a rust exposure trial showed that S.288 and S.795 were immune in the presence of race I. In the race I endemic leaf rust area the performance of K7 has been outstanding, considerable resistance being shown. At the Coffee Res. Sta. 3 lines of Ethiopian origin are being grown, viz. S.12 Kaffa, resistant to all races except X, and S.4 Agaro and S.6 Cioiccie resistant to all known races.

BURDEKIN (D. A.). **Wind and water dispersal of Coffee leaf rust in Tanganyika.**—*Kenya Coffee*, **25**, 294, pp. 212–213, 219, 2 fig., 1960.

In studies in Kenya to test Nutman's theory of the dispersal of *Hemileia vastatrix* spores by water-splash [**40**, 106], water collected from dripping wet, rusted leaves was examined and found to contain numerous rust spores. In contrast to Nutman's observations, however, spores were readily blown off some leaves. Spores were caught in a trap 3 in. above the ground under or 6 ft. away from heavily to slightly affected bushes, large numbers of the spores being dispersed in groups of < 150 spores/group. Spores from green fallen leaves had a relatively high germination. Surveys also demonstrated the presence of considerably more leaf rust on the lower than on the upper primaries of the trees. The many spores recorded in the air below, together with those washed down, probably account for the heavy infection on the lower part of the tree. The evidence clearly demonstrated that *H. vastatrix* may be dispersed both by wind and water.

NUTMAN (F. J.) & ROBERTS (F[LORENCE] M.). **Investigations on a disease of Coffea arabica caused by a form of Colletotrichum coffeanum Noack. I. Some factors affecting infection by the pathogen.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 489–505, 2 pl. (13 fig.), 4 graphs, 1960.

It is suggested from Dept Agric., Nairobi, Kenya, that coffee berry disease (*Glomerella cingulata*) [**39**, 412 *et passim*] has arisen because of mutation of the pathogen from a mildly parasitic to a virulent form before 1922. Conidia obtained from lesions on ripe berries were more pathogenic than those from green berries, both of which sources were superior to potato dextrose agar cultures. The most susceptible organs were flowers, very young fruits, and ripe berries; variation in susceptibility may be correlated with variation in the rate of conidial germination on different types of tissue, though this does not account for differences in varietal susceptibility. All parts of the plant are liable to attack and under certain conditions, such as excessive hail damage, the fungus may cause Elgon dieback [**35**, 276].

The most resistant var. is Blue Mountain, Harar is the most susceptible, and the susceptibility of all vars. is increased by wounding. Extracts from Blue Mountain berries added to infection drops increased susceptibility, while Harar extracts had no such effect, so the resistance of Blue Mountain cannot be due to a fungistatic tissue component. Varietal susceptibility is therefore ascribed to a chemical or physical difference in the cuticle, which makes penetration more difficult. At the opt. temp., *ca.* 22° C., with a suitable R.H., infection can occur in 2 hr.

NIGAM (S. S.), RANGANATHAN (S. K.), SEN GUPTA (S. R.), SHUKLA (R. K.), & TANDAN (R. N.). **Microbial degradation of Cotton cellulose in soil.**—*J. sci. industr. Res.*, **19** C, 1, pp. 20–24, 1960.

Studies at the Defence Res. Lab. (Stores), Kanpur, India, on the micro-organisms isolated from compost (sandy loam soil, fresh cow dung, and chopped straw) and cotton cellulose samples buried therein are reported and tabulated. Bacteria and actinomycetes predominated during the initial stages of degradation, while fungi developed later and completed the process; thus, fungus colonies had risen from 2,000/g. fabric at the start to 45,000 on the 28th day, whereas bacteria at 190,000 and actinomycetes at 50,000 had both fallen to 0. Among the fungi identified were many common moulds. *Penicillium* spp. were eliminated during the early stages of burial and the populations of *Aspergillus niger*, *A. flavus*, and *A. oryzae* decreased gradually, whereas *A. ustus*, *M. echinata*, and *F.* spp. increased.

The opt. moisture content of the soil for cotton-cellulose degradation lay between 25 and 30%, at which level 100% loss in tensile strength was reached after 16 days' burial.

BOGUSŁAWSKI (W.). **Wpływ terminu siewu Lnu na porażenie rdzą Melampsora lini (Pers.) Lév.** [Influence of sowing period on the rust *M. lini* infection in Flax.]—*Biul. Inst. Ochr. Roś., Poznań, 1960*, pp. 129–137, 1960. [Russ., Engl. summ. Cyclostyled.]

At Inst. Plant Prot., Reguły, Poland, flax sown in Apr. was considerably less affected (incidence 1–17·8%) by *M. lini* [cf. **36**, 320] than that sown in May and June (37–92·8%).

HOFFMANN (G. M.). **Untersuchungen über den Stengelbruch und die Stengel- und Blattbräune des Leins (Polyspora lini Laff.).** [Studies on stem break and stem and leaf browning (*P. lini*) of Flax.]—*Phytopath. Z.*, **38**, 4, pp. 321–341, 14 fig., 3 graphs, 1960. [Engl. summ.]

A detailed description of the disease symptoms on the cotyledons, foliage leaves, stems, buds, flowers, and capsules is followed by results of further studies [cf. **38**, 477] at the Inst. für Phytopathologie, Aschersleben, Germany. On unwounded

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leaves the conidia of *P. lini* germinate only slightly or not at all. The short germ tubes are unable to penetrate the leaf. No formation of appressoria was seen. The conidia multiply on the leaf by budding. Infection experiments showed the incubation time to be 10–12 days, the disease reaching its climax after 20 days. Belgian linen flax and the Bernburg breeding lines 26 and 112 were attacked only slightly. *P. lini* was not capable of multiplying in non-sterilized soil.

Van der Spek (J.). **De bestrijding van Botrytis in Lijnzaad.** [Control of *Botrytis* infection of Flax seed.]—*Tijdschr. PlZiekt.*, **66**, 2, pp. 91–101, 1960. [Engl. summ.]

It is concluded at the Inst. voor Plantenziektenkundig Onderzoek, Wageningen, that all measures which favour rapid drying of the flax crop after rain, e.g. good manuring to obtain a rigid stand, and a rate of sowing giving one that is not too dense, are inimical to infection of the plants and hence of the seed by *B. cinerea* [**38**, 408]. The rainy summers common in the Netherlands, however, prevent control by these means alone. Seed treatments with panogen, liquid and dry aabiton, and dry aagrana '48 give very satisfactory results against medium or heavy infection if applied at least 3–4 weeks before sowing. Disinfection is not influenced by temp. in the range 2·5–20° C. or by moisture content of the seed below 13%; high moisture may be unfavourable and the seed should not be subjected to damage by heavy threshing.

Protectants based on thiram (with or without Hg), captan, or quinone are recommended for slightly infected or healthy seed. For a 2nd treatment with a seed protectant after disinfection with a volatile Hg, captan or quinone fungicides may be used, but not thiram, which reacts with volatile Hg.

Lambe (R. C.). **Diseases of cut greenery in Oregon.**—*Plant Dis. Reptr*, **44**, 9, pp. 718–720, 6 fig., 1960.

From Ore. State Coll., Corvallis, it is noted that considerable losses are caused during growth, transit, and storage by *Taphrina faulliana* on sword fern (*Polystichum minutum*), *Microsphaera* sp. and *Phyllosticta gaultheriae* on salal (*Gaultheria shallon*), and *Venturia vaccinii* on huckleberry (*Vaccinium ovatum*).

Gasiorkiewicz (E. C.). **Influence of nitrogen and potassium nutrition levels on the development of Fusarium systemic wilt of Carnations.**—Abs. in *Phytopathology*, **50**, 9, p. 636, 1960.

Incipient and irreversible wilt of William Sim carnations grown in sand culture and inoculated with *F. oxysporum* f. *dianthi* [**39**, 711] was most frequent at 25 p.p.m. N and 15 p.p.m. K. High N (150 and 200 p.p.m.) increased symptom severity and low K (15 and 30 p.p.m.) induced severe root symptoms. Disease index, based on symptom expression, did not always agree with the parasitic efficiency ratings calculated from total plant growth or dry wt. analysis of shoots and roots.

Phillips (D. J.). **Histochemical and morphological studies of Carnation stem rot.** —Abs. in *Phytopathology*, **50**, 9, p. 651, 1960.

Carnation cuttings were inoculated with 10, 100, and 1,000 conidia of *Fusarium roseum* f. *cerealis*/ml. perlite 0–18 days after striking and sampled for 26 days [**38**, 78]. The pathogen entered the stems through areas damaged by emerging roots and through the freshly cut base [cf. **39**, 584]. Invasion was limited to lignified tissues and was mostly intracellular.

Endo (R. M.). **A virus disease of Hibbertia scandens.**—Abs. in *Phytopathology*, **50**, 9, p. 634, 1960.

In coastal areas of Calif. *H. scandens*, which is vegetatively propagated, is 100%

infected by strs. of cucumber mosaic virus. Symptoms were most severe at 50 and 59° F. Cuttings from symptomless shoots developed at av. day and night temps. of 98° and 60° were usually virus-free.

JONES (J. P.) & JOHNSON (H. W.). **Phytophthora root and stem rot of Lupines.**—Abs. in *Phytopathology*, **50**, 9, p. 641, 1960.

Seedlings of *Lupinus angustifolius*, *L. luteus*, and *L. albus* wilted and died when seed was sown in pots of soil from a field at Stoneville, Miss., previously cropped with soybean infected by *P. megasperma* var. *sojae* [**39**, 451]. Isolates from the lupins were pathogenic to susceptible soybean vars., to the 3 lupins, and to 3 native *L.* spp. inoculated by stem puncture and were identified as *P.m.* var. *sojae*.

HAASIS (F. A.) & HODGES (C. S.). **An angular leaf spot of Magnolia grandiflora caused by Isariopsis sp.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

During 1959–60, 1- and 2-year-old seedlings in 3 localities in N. Carol. developed numerous, discrete, dark brown to black, angular spots, 1–2 mm. diam., with a narrow yellow halo. Conidia of *I.* sp., borne on the lower leaf surface, were 2- to 3-septate and $33{\cdot}7 \times 5{\cdot}7\ \mu$. The disease was reproduced by inoculation.

REINERT (R. A.), HILDEBRAND (A. C.), & BECK (G. E.). **Mechanical transmission and host range studies of several Geranium viruses.**—Abs. in *Phytopathology*, **50**, 9, p. 652, 1960.

Viruses causing crinkle, atypical crinkle, and a chlorotic-type symptom on *Pelargonium hortorum* [**38**, 698] were transmitted by grafting to seedling pelargonium and by sap inoculation to pepper [*Capsicum*], seedling pelargonium (with exception of atypical crinkle), *Chenopodium amaranticolor*, 2 tobacco vars., and *Nicotiana debneyi*. The test plants were kept in darkness at 30° C. for 24 hr. before inoculation and rubbed with a buffered homogenate prepared from infected pelargoniums.

SAKSENA (H. K.). **Blight of Pilea muscosa caused by Colletotrichum capsici.**—*Plant Dis. Reptr*, **44**, 9, p. 697, 1960.

C. capsici [**39**, 278] isolated from *P. muscosa* was also pathogenic to *Capsicum annuum* and *Tagetes erecta* [**38**, 751] in inoculation tests at the Govt. agric. Coll., Kanpur, India.

MUNNECKE (D. E.). **Hairy root of field Roses.**—Abs. in *Phytopathology*, **50**, 9, pp. 647–648, 1960.

The disease causes serious losses in Calif. Many roots 1–10 in. long arise from soft galls on cutting bases, on disbud wounds, and on the roots. Growth becomes unthrifty in the 3rd yr. and death may occur in the 4th yr. or later. An as yet unidentified bacterium, intermediate in pathogenicity between *Agrobacterium tumefaciens* (which may also occur) and *A. rhizogenes* [cf. **38**, 527], was isolated. Hairy root was controlled commercially by dipping cutting wood for 15 min. in 0·5% Ca hypochlorite, taking strict sanitary precautions in making and storing cuttings, and planting on land free from roses or crops susceptible to *A. tumefaciens* for at least 2 yr. Soil drenches with ethylene dibromide were also helpful.

RAABE (R. D.). **Fusarium wilt of Sedum.**—Abs. in *Phytopathology*, **50**, 9, p. 651, 1960.

A new form of *F. oxysporum* isolated from *S. amecamecanum* in Calif. is tentatively named *F.o.* f. *sedi*.

HENDRIX (F. F.) & RAABE (R. D.). **Sclerotinia blight of Gloxinia.**—Abs. in *Phytopathology*, **50**, 9, p. 638, 1960.

S. sclerotiorum causes a soft rot of the flowers of *Sinningia speciosa* in greenhouses

in Santa Cruz, Calif: they fall off and infect the leaves and petioles, the rot frequently spreading to the growing point. Ascospores were able to infect only the flowers.

Dolan (D. D.) & Braverman (S. W.). **Evaluation of foreign forage legumes and grasses—introduced mostly from Europe.**—*Agron. J.*, **52**, 9, pp. 551–553, 3 fig., 1960.

At the Northeastern Regional Plant Introduction Sta., Geneva, NY., in 1956 and 1957, P.I. 236606 *Medicago falcata* (from France) was fairly tolerant of black stem (*Ascochyta imperfecta*) but susceptible to leaf spot (*Pseudopeziza medicaginis*); P.I. 217419 lucerne ('Doehnfeldt' in Denmark) was very susceptible to leaf spot, and P.I. 234443 lucerne (from Belgium) was susceptible to both diseases. The abundant foliage of P.I. 234838 red clover (Germany) remained completely unaffected by powdery mildew (*Erysiphe polygoni*) during severe epidemics in the middle and late summer of each yr. P.I. 234678 white clover (French) remained free from mosaic [virus] symptoms and was highly tolerant of pepper spot (*Pseudoplea trifolii*). P.I. 161878 *Lotus corniculatus* (Argentina) was tolerant of *Sclerotinia trifoliorum*, exceptionally severe in 1958, and appeared to be highly tolerant of *Stemphylium loti* also. P.I. 237191 *Phleum pratense* (Netherlands) remained free from the prevailing diseases *Puccinia graminis*, *Helminthosporium dictyoides*, and *Scolecotrichum graminis*, while P.I. 234444 (Belgium) remained free from *P. graminis* and was tolerant of *H. dictyoides* var. *phlei*. P.I. 234695 *Phalaris arundinacea* (Denmark) was in full bloom on 30 June and so far had remained free from *E. graminis*.

Bos (L.), Maat (D. Z.), Bancroft (J. B.), Gold (A. H.), Pratt (M. J.), Quantz (L.), & Scott (H. A.). **Serological relationship of some European, American, and Canadian isolates of the White Clover mosaic virus.**—*Tijdschr. PlZiekt.*, **66**, 2, 1 diag., 1960. [Dutch summ.]

The authors, who had previously been working independently on white clover mosaic virus [**39**, 113], exchanged antisera, and where possible virus isolates, in 1959. Serological tests indicated a qualitative relationship between a Dutch, a German, a Canadian, and some U.S.A. isolates. Exact quantitative relationships can only be studied if isolates are exchanged: a comparison of 2 isolates, the Dutch WKV and the U.S.A. WCMV (provided by Bancroft), with several different antisera by cross-absorption tests revealed no quantitative differences.

Antiserum against Fry's clover mosaic virus from New Zealand [**39**, 232] gave positive results against 2 Canadian isolates and 1 Dutch isolate.

Chi (C.-C.) & Hanson (E. W.). **The mechanism of wilting incited by Fusarium in Red Clover.**—Abs. in *Phytopathology*, **50**, 9, p. 631, 1960.

In further studies [cf. **39**, 232] filtrates from *F. oxysporum* and *F. solani* caused wilting of cut red clover in 8 hr., possibly because of the production of a pectinase.

Bogacheva (Mme V. I.) & Korobeĭnikova (Mme A. V.). Вредители и болезни Клевера в Свердловской области и меры борьбы с ними. [Pests and diseases of Clover in the Sverdlovsk area and control measures.]—48 pp., 7 fig., Sverdlovsk, Urals branch Acad. Sci. U.S.S.R., 1957. Roubles 1.15.

This brochure contains a sect. (pp. 31–47) on the main diseases in the Sverdlovsk area, including *Kabatiella caulivora* [map 351], *Sclerotinia trifoliorum* [274], and *Botrytis anthophila* [167]. There are brief descriptive notes on the causal agents and controls.

Kivi (K.). **Punasel ja roosal Ristikul esinenud seenhaigustest Põlva, Rapla ja Tartu rajoonis 1956.** [On diseases of Red and Pink Clover in the Pulva, Rapla, and

Tartu regions in 1956.]—Сборн. науч. Труд. Студ. Эст. сел.-хоз. Акад. [*Sborn. nauch. Trud. Stud.Ést. sel.-khoz. Akad.*], *1959*, 1, pp. 66–69, 1959. [Russ. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 13, p. 190, 1960.]

Of 9 fungus diseases of pink and red clover described the most serious in Estonia are clover canker [*Sclerotinia trifoliorum*: cf. above], black leaf spot [*Cymadothea trifolii*], harmful in the conidial state, rust [*Uromyces trifolii*: **37**, 297], and powdery mildew [*Erysiphe polygoni*: **38**, 322]. Ascochytosis [*Ascochyta* sp.] is a new clover disease in Estonia.

Latch (G. C. M.) & Hanson (E. W.). **Stem diseases of Sweet Clovers.**—Abs. in *Phytopathology*, **50**, 9, p. 643, 1960.

Mycosphaerella lethalis, *M. davisii*, and *Ascochyta caulicola* cause important stem diseases of *Melilotus* spp.; all 3 were isolated from surface-disinfected seeds. The diseases developed best at 16–28° C. and low light intensity. *Mycosphaerella lethalis* and *A. caulicola* penetrated the leaves directly within 16 hr. of inoculation and sometimes through the stomata; *M. davisii* in 24 hr., only through stomata.

Graham (J. H.). **Rapid screening of Alfalfa for resistance to Corynebacterium insidiosum by inoculating petioles.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

Petioles near the tips of 6–8-week-old lucerne seedlings or of young shoots were inoculated at the junction of the 2 lateral leaflets with a hollow glass needle dipped in a colony of *C. insidiosum*. Leaves of susceptible plants became partly yellowed while those of resistant plants remained green. By this method 53% of about 75 Vernal seedlings were rated resistant, 40% Buffalo, 5% Du Puits, and 4% Narragansett [cf. **39**, 592]. When seedlings of the same vars. were inoculated by the root-ball soak method the ratings were 20% higher.

Posnette (A. F.). **The economic importance of virus diseases of fruit trees in England.**—*N.A.A.S. quart. Rev.*, **48**, pp. 170–175, 1960. [15 ref.]

Following a brief review of the damage caused by virus diseases of cherry, plum, apple, and pear, they are placed in 4 categories. The 1st comprises viruses of local importance which would cause severe losses if they became prevalent, e.g. apple star crack [**38**, 561], pear bark blister [**39**, 596] and stony pit [cf. **36**, 330], cherry rasp leaf, leaf roll, little cherry, and virus canker [**37**, 173; cf. **39**, 601], and plum pox [cf. **39**, 652]. Also of importance is the 2nd group, diseases which are prevalent and diminish yield by 20% or more, including apple mosaic [**38**, 606], pear vein yellows [**38**, 609], cherry necrotic ring spot [peach ring spot: cf. **39**, 601], sour cherry yellows [loc. cit.], and plum stunt and prune dwarf. The 3rd group consists of those viruses which are of importance only in a limited range of vars., and the 4th, including a number of latent viruses, covers those which are unimportant on the vars. grown now.

Brezhnev (D. D.) & Vlasyuk (I. A.) (Editors). Развитие садоводства и виноградарства Крыма. [Development of horti- and viticulture in the Crimea.]—470 pp., 24 fig., 1 diag., 5 graphs, 2 maps, Simferopol', Krŷmizdat, 1959. Roubles 20.

Of 39 papers in this symposium, held under the auspices of the Ukrainian Acad. agric. Sci. in May 1958, the following may be noted:

Livshits (I. Z.). [A combination of chemical measures for control of pests and diseases of orchards in the Crimea] (pp. 255–274). At Nikita State Bot. Gdns, zineb at 0·25–0·5% proved as effective, and at 0·75% more effective, than 1% Bordeaux mixture in control of apple scab [*Venturia inaequalis*: cf. **39**, 422]. In various pesticide–fungicide combinations 1% Bordeaux mixture against apple scab, pear scab [*V. pirina*: cf. **36**, 337] and rust [*Gymnosporangium* spp.], peach leaf curl [*Taphrina*

deformans: cf. **38**, 165], plum grey rot (*Monilia* [*Sclerotinia laxa*]) and *Clasterosporium* [*carpophilum*: cf. **38**, 338], apricot scald (*M.* [*S. fructigena*]), and *C.* [*carpophilum*] on apricot and peach [cf. **37**, 292]), and also 3% GKhTsG dust (against pear scab and grey rot of plum) were among the most frequently used.

Parfenov (A. T.). [Experiments on the eradication of the main pests and diseases of fruit trees in the orchards of the Crimean exp. Sta. of Hort.] (pp. 275–282). For combined control the Station recommends sprays with 8–10% mineral oil emulsion in early spring: 2–3 sprays with DDT+Bordeaux mixture, anabasin sulphate, or nicotine sulphate, or with mercaptophos (pear trees with hexachlorane+thiophos) in the flowering period; and 3 sprays at 15–16 days' intervals with DDT+Bordeaux mixture+ethersulphonate (thiophos for pear trees) in summer.

Nikolaev (P. I.). [Protection of Vine from pests and diseases] (pp. 393–403). In this survey by the All-Union sci. Res. Inst. of Wine-making and Viticulture 'Magarach', Yalta, mildew [*Plasmopara viticola*: cf. **39**, 368] and oidium [*Uncinula necator*] are noted as the most widespread diseases, [unspecified] bacterial canker, [unspecified] root rot, black rot [*Guignardia bidwellii*], white rot [*Coniella diplodiella*: cf. **38**, 443], red rot [*Pseudopeziza tracheiphila*], grape rot [? *Botrytis cinerea*: cf. **38**, 347], cercosporiosis [*Cercospora vitis*], chlorosis, and sun burn also occurring to a greater or lesser degree in the Crimea. Anthracnose spot [*Elsinoe ampelina*] has recently spread in from Armenia [map 234]. Bordeaux mixture proved superior to dinitrorhodanbenzene [cf. **39**, 531], Cu oxychloride, fuclasin [cf. **39**, 150], and zineb in control of mildew. A combined application of biological and antibiotic methods of control, as yet untried, is advocated.

A spraying guide for the control of pests and diseases of fruit trees.—*J. Agric. W. Aust.*, **1** (Ser. 4), 8, pp. 721–735, 1960.

A number of charts prepared for the convenience of fruit growers includes a compatibility chart for insecticides, fungicides, fertilizers, and herbicides, a spray dilution table, nutritional sprays for fruit trees, and separate spray schedules for pests and diseases of apples, pears, stone fruit, and citrus.

Skepper (A.). **Concentrate spraying of deciduous fruit trees.**—*Agric. Gaz. N.S.W.*, **71**, 6, pp. 296–303, 5 fig., 1960.

In this review of advances in fruit tree spraying over the past 5 yr. are descriptions of new techniques and machines introduced on account of the increase in the use of concentrate spraying [**39**, 663]. A table lists a number of sprays with suggested quantities/125 gal. vat or /1⅔ acres of trees for a machine driven at 1½ m.p.h. applying 70–75 gal./acre, together with the equivalent dilute strength, and another gives the relationship between speed and row spacing on quantity/acre at 2·5 gal./minute output.

Millikan (D. F.) & Guengerich (H. W.). **Spy 227, a sensitive indicator for Apple viruses.**—Abs. in *Phytopathology*, **50**, 9, p. 646, 1960.

In a comparative test with other indicators Spy 227 proved to be the most sensitive. In addition to the lethal effect already noticed [**39**, 179], symptoms of epinasty or mottle developed on inoculation with some virus sources.

Cation (D.). **Negative transmission of an Apple virus through seeds.**—*Plant Dis. Reptr*, **44**, 9, p. 695, 1960.

At the Mich. State Univ., E. Lansing, no evidence was obtained of seed transmission of the virus causing the chlorotic leaf spot syndrome on the indicator clone R 1 2740–7A [**40**, 114].

Osterwalder (A.). **Die Herbstformen des Apfel- und Birnschorfpilzes (Venturia inaequalis Cooke und Venturia pirina Cooke, Aderh.).** [The autumn form of

the Apple and Pear scab fungi (*V. inaequalis* and *V. pirina*).]—*Schweiz. Z. Obst- u. Weinb.*, **69**, 12, pp. 285–288, 2 fig.; 13, pp. 306–309, 2 fig.; 14, pp. 330–332, 2 fig., 1960.

At the Eidg. Versuchsanstalt, Wädenswil, Switzerland, *V. inaequalis* and *V. pirina* [**37**, 261] were shown to develop a more vegetative type of growth in the lower epidermis of the leaves in autumn, without the copious production of conidia typical of scab spots in May–July, hence the name 'bald or autumn scab' given to this stage, which on apple can be distinguished by the lilac hue of the spots and leaf edges, and on pear by the green-black discoloration of the lower surface. More 'pycnidia' are noticeable on the leaves of both hosts. Both fungi also produce spherical, thick-walled spores, about 25 μ diam., apparently for overwintering.

Jaarverslag 1959 Proefstation voor de Fruitteelt in de volle grond. [Report for 1959 of the Experiment Station for Outdoor Fruit Culture, Wilhelminadorp, Netherlands.]—80 pp., 13 fig., 6 graphs, 1960. [Engl. summ.]

In the mycological sect. (pp. 41–45) [cf. **39**, 115] G. S. Roosje reports that conidia of *Podosphaera leucotricha* from infected apple prunings are able to germinate 9 days after pruning. Studies of the relation between weather and the occurrence of conidial infection, though not conclusive, suggested that infection may occur under a variety of weather conditions. Attempts to base control on infection periods were unsuccessful and only weekly spraying with 0·06% karathane from the pink-bud stage till the shoots stopped growing gave satisfactory control. Much reticulate russeting appeared from 20 Apr.–11 May, between pink-bud and the end of flowering; infection of terminal buds apparently occurred in July.

Blumer (S.). **Gloeosporium perennans in der Schweiz.** [*Pezicula malicorticis* in Switzerland.]—*Schweiz. Z. Obst- u. Weinb.*, **69**, 13, pp. 303–306, 2 fig., 1960.

This is the 1st report, from the Eidg. Versuchsanstalt, Wadenswill, of *P. malicorticis* [map 128; **39**, 595] on apple in Switzerland. So far its incidence is restricted and its origin uncertain.

Tweedy (B. G.) & Powell (D.). **Alternaria rot of Apple.**—Abs. in *Phytopathology*, **50**, 9, p. 657, 1960.

Alternaria sp. was isolated in 1958 and 1959 from small, black, superficial lesions, $\frac{1}{16}$–$\frac{1}{8}$ in. deep and $< \frac{1}{4}$ in. diam., with a central minute hole and a light halo on Jonathan apple fruits in Ill. One orchard developed 35% infection. In inoculation experiments Winesap and Rome Beauty were resistant, Jonathan and Golden Delicious susceptible. Wounding was essential for infection; the opt. temp. for growth was 30° C. and for sporulation 26°. *Alternaria* cultures from apple leaves were similar to, but not identical with, the fruit isolate [cf. **36**, 342].

Cameron (H. R.). **Infection of Pear roots with Phytophthora cinnamomi.**—Abs. in *Phytopathology*, **50**, 9, p. 630, 1960.

Inoculations with fungi isolated from soil under affected trees suggest that quick collapse of pear in W. Ore. is due to *P. cinnamomi*. Roots of Bartlett pear seedlings were very susceptible in the greenhouse at soil temps. corresponding to those in summer in the field.

Luepschen (N. S.). **Fire blight control with streptomycin as influenced by temperature and other environmental factors, and by adjuvants added to sprays.**—*Diss. Abstr.*, **20**, 10, p. 3917, 1960.

At Cornell Univ. the opt. temp. for *Erwinia amylovora* [**40**, 55] in nutrient broth cultures was 24° C.; growth was greatly reduced below 21° and above 30°. Strepto-

mycin [**39**, 477] was more inhibitory, as measured by a disk-diffusion method, above and below the opt. temp., and was completely lethal only below 18°.

Good control of blossom blight on potted dwarf pear trees at 60–70° F. was achieved with protective pre-inoculation streptomycin sprays combined with a 24-hr. post-inoculation spray. Control was reduced by $\frac{1}{3}$ by artificial rain 30 hr. after treatment. Streptomycin penetration was improved by the addition of glycerol or triton B-1956. Glycerol alone at 0·5% reduced shoot blight, though not antibacterial *in vitro*.

In field trials very good control of blossom blight on Bosc and Gorham pears was given by 2 or 3 applications of 100 p.p.m. streptomycin but 2 sprays at 200 p.p.m. on Clapp's Favourite were not effective.

High R.H. plays a greater part than temp. in facilitating cuticular penetration by the antibiotic. Streptomycin nitrate was slightly superior to the sulphate against blossom blight, while the sulphate and pectate were equally effective against apple shoot blight.

Fulton (R. W.) & Hamilton (R. I.). **Serological differentiation of Prune dwarf and Sour Cherry necrotic ringspot viruses.**—Abs. in *Phytopathology*, **50**, 9, pp. 635–636, 1960.

Previous conclusions that prune dwarf and [peach] necrotic ring spot viruses [**39**, 331] are unrelated were confirmed by serological studies.

Wagnon (H. K.), Nichols (C. W.), & Rosenberg (D. Y.). **A virus-caused stunt of Apricot and its relationship to certain other stonefruit virus diseases.**—Abs. in *Phytopathology*, **50**, 9, p. 658, 1960.

When budwood from a stunted Quetta nectarine was grafted on Blenheim apricot, previously undescribed symptoms, including a shortening, thickening, and roughening of the shoots, developed in the spring, becoming less noticeable as the season progressed. Stunt symptoms were transmitted by grafting from these trees to Anza peach. In a commercial orchard in Calif. Hemskirke apricots with similar but milder symptoms yielded a virus that caused prune dwarf on Italian prune, gumming and cortical necrosis on Shirofugen cherry, and stunt on Elberta peach.

Ogawa (J. M.) & Wilson (E. E.). **Effects of the combination of sodium pentachlorophenoxide and liquid lime-sulfur on the brown-rot fungi.**—Abs. in *Phytopathology*, **50**, 9, p. 649, 1960.

The production of sporodochia by *Sclerotinia laxa* on flowers and twigs of almond and nectarine and the sporulation of *S. fructicola* on mummy peach fruits was reduced by an early dormant application of 8 lb. 37% SPCP + 11·2 gal. 32° Baumé liquid lime-sulphur, the combined spray being more effective than SPCP alone.

English (H.) & Davis (J. R.). **The source of inoculum for bacterial canker and blast of stone fruit trees.**—Abs. in *Phytopathology*, **50**, 9, p. 634, 1960.

Green-fluorescent pseudomonads, presumably *Pseudomonas syringae*, were washed from the surfaces of healthy leaves, fruits, and twigs of peach and apricot and from orchard weeds and other apparently healthy woody plants in surveys of orchards in Calif. The pathogen can evidently subsist as an epiphyte on a wide variety of plants.

Carter (M. V.). **Further studies on Eutypa armeniacae Hansf. & Carter.**—*Aust. J. agric. Res.*, **11**, 4, pp. 498–504, 1 pl., 1960.

At the Waite agric. Res. Inst., Adelaide [cf. **38**, 381], 1-yr.-old wood of a dormant apricot tree in the field was pruned and horizontal cut surfaces inoculated immediately with a heavy suspension of ascospores of *E. armeniacae*. Many spores were

found within the vessels 21 hr. later, mostly 300–1300 μ from the inoculated surface; the farthest penetration observed was 4·5 mm. Most of these ascospores had germ-tubes up to twice the spore length [cf. **3**, 278].

A statistically significant trend was found towards reduced susceptibility with increasing age of winter pruning wounds and any dressing to protect exposed vessels in the growing season after pruning should give good control. Conventional methods of prophylactic spraying and the destruction of inoculum are of little help. Under favourable conditions outdoors mature perithecia developed on lopped infected limbs in the 3rd winter after removal.

The perfect state of *E. armeniacae* was found on dead wood of apple [**37**, 93].

Mirocha (C. J.), Devay (J. E.), & Wilson (E. E.). **A quantitative method for determining fumaric acid, a toxin involved in the hull rot disease of Almond.**

Mirocha (C. J.), Wilson (E. E.), & Devay (J. E.). **The role of fumaric acid, a fungal toxin, involved in the hull rot disease of Almond.**—Abs. in *Phytopathology*, **50**, 9, p. 646, 1960.

A method is described for the micro-quantitative determination of fumarate as the diethyl ester, using gas liquid chromatography. In culture on almond-hull media pathogenic strs. of *Rhizopus stolonifer*, *R. circinans*, and *R. arrhizus* produced 0·6–2 mg. fumaric acid/ml. medium [cf. **39**, 387].

Injection of metabolic products into fruits on orchard trees demonstrated that the symptoms caused by *Rhizopus* infection could be due to fumaric acid, which was present at 0·2 mg./g. dry wt. in diseased hulls (healthy 0·07 mg.) and appears to be highly toxic when translocated to leaves and stems.

Gilmer (R. M.). **Recovery of X-disease virus from naturally infected milkweeds.**—Abs. in *Phytopathology*, **50**, 9, p. 636, 1960.

Asclepias syriaca growing near [peach] X-diseased chokecherries [*Prunus virginiana*] in Western N.Y. showed virus-like symptoms including short, rosetted, proliferated shoots with small, chlorotic leaves. A virus was transmitted by dodder from these plants to *A. syriaca*, periwinkle [*Vinca*], and tomato, but not to aster or peach; the same hosts were infected, with similar symptoms, by the virus from chokecherry.

Miller (P. W.). **Apparent inactivation of latent A Strawberry virus in Fragaria vesca plants in preliminary tests.**—*Plant Dis. Reptr*, **44**, 9, pp. 702–703, 1960.

In preliminary greenhouse tests at the U.S. Dept Agric., Corvallis, Ore., sprays of β-propiolactone (4,000–8,000 p.p.m.) inactivated strawberry latent virus A [**38**, 707; **40**, 118] in 6·6% of 75 *Fragaria vesca* plants treated.

Kennedy (B. W.) & King (T. H.). **Angular leafspot, a new disease of Strawberry.**—Abs. in *Phytopathology*, **50**, 9, pp. 641–642, 1960.

In summer 1959 severe defoliation occurred in strawberry fields under sprinkler irrigation in Minn. Dark green, watersoaked, angular lesions appeared first on the lower surface of the leaves, later becoming visible as red or brownish spots on the upper surface. A bacterium was isolated which reproduced the symptoms on inoculation of watersoaked leaves. Well-fertilized plants were more susceptible than those with N, P, or K deficiency. The pathogen was found to have survived desiccation in affected leaves kept in a herbarium for 10 yr.

Price (D.). **The effects of several spray regimes on Banana fruit weights.**—*Trop. Agriculture, Trin.*, **37**, 4, pp. 325–328, 1960.

At the Res. Div., Cameroons Development Corp., S. Cameroons, it was established

that a spray of refined oil with an unsulphonated mineral residue of 96% used against *Mycosphaerella musicola* [**38**, 21] adversely affected the growth and development of the banana fruit, but if growers switched to Cu-based fungicides adequate control was not obtained owing to a slow build-up of ascospore infection; a combination may be the best solution. In the rainy season in the S. Cameroons leaf spot is virtually dormant as conidia are washed off before maturity and conditions are not favourable for ascospore discharge [**39**, 726]. If oil is used in the early rains to reduce ascospore infection during the season when little fruit is shot, with an intermediate period when control is unnecessary, then Cu sprays may be used after the rains with confidence.

Beckman (C. H.), Mace (M. E.), & Halmos (S.). **Physical barriers in relation to Fusarium wilt resistance in Bananas.**—Abs. in *Phytopathology*, **50**, 9, p. 628, 1960.

Functional metaxylem elements in Gros Michel banana roots were shown to have cross-walls with minute pores which allowed the passage of particles less than 2 mμ but not spores of *F.* [*oxysporum* f. *cubense*: **39**, 726]. Particle passage increased in older metaxylem, where the pores were larger, and infection was more extensive in older roots than in younger following puncture inoculations with a spore suspension. Spores moved more freely in Gros Michel than in 2 resistant vars. Though prevention of spore passage alone may not provide resistance it can retard advance of the pathogen.

Skotland (C. B.). **A virus disease of Hops, Humulus lupulus, in Washington.**—Abs. in *Phytopathology*, **50**, 9, p. 655, 1960.

Symptoms on Early and Late Cluster hops included a curving of the shoot tip, stunting, darkening and downward cupping of the leaves, and leaf distortion. The virus, a mild str. of hop mosaic [cf. **38**, 612], was transmitted by grafting to Petham Golding and Early Prolific, which developed vein clearing and mottling. Symptom expression is favoured at 70–80° F. but is masked above 85°.

Fordyce (C.) & Green (R. J.). **Studies of the host specificity of Verticillium albo-atrum var. menthae.**—Abs. in *Phytopathology*, **50**, 9, p. 635, 1960.

Of 10 single-spore cultures after several serial passages, 2 were virulent in potato and 3 in tomato, though all originally produced no symptoms on these hosts. The remainder were unchanged as regards virulence. Passage through tomato, but not potato, resulted in the cultures becoming avirulent to peppermint [cf. **35**, 844; **40**, 60].

Moens (P.) & Fraselle (J. V.). **Étude expérimentale de la cercosporiose du Palmier Elaeis. Essai factoriel d'inoculation sur jeunes plants de pépinière.** [An experimental study of cercosporiosis of Oil Palm. A factorial inoculation experiment on young nursery plants.]—*Oléagineux*, **15**, 8–9, pp. 609–617, 8 fig., 6 graphs, 1960. [16 ref.]

The susceptibility of young potted oil palms to *Cercospora elaeidis* [cf. **38**, 382] at I.N.E.A.C., Yangambi, was increased by unfavourable moisture conditions, though mineral nutrition had virtually no effect. Adequate and regular watering ensured good growth and a low incidence of infection, even under inoculation.

Gel'tser (F.) & Cherednichenko (I.). Новое о причинах вырождения Картофеля. [New information on the causes of Potato degeneration.]—Картофель Овощи [*Kartofel' Ovoshchi*], **5**, 6, pp. 24–25, 2 fig., 1960.

Roots of numerous potato vars. were studied at Moscow sect., All-Union Inst. agric. Microbiol., and the relationship between mycotrophy [**26**, 261] and degeneration [cf. **38**, 416] established. In degenerate plants endophytes were lacking, while

they were occasionally present in roots of healthy haulms planted in the lowlands. The number of endophytes was somewhat greater in roots on low peats. Seed potatoes from peat beds when planted in mineral soils have more of fungi in the roots than plants from similar seed from mineral soils. Roots of plants from true seed are richest in fungi. Of such vars. grown at V.I., Édel'shteĭn, Agronomicheskiĭ, Smȳslovskiĭ, Épron, and Katahdin were most mycotrophic. In the 5th yr., however, they were not different from tuber propagated lines. The most mycotrophic vars. were those from the S. Ossetin region, cultivated for a long period at 2,200 m. above sea-level. In fixed roots of Epicure, Priekul'skiĭ rannīĭ, Imandra, Épron, Sovetskiĭ Varba, Frühbote, etc. cultivated for 8–22 yr. in these conditions, endophytes and their vesicles occurred only in some places. It was established that when many fungi are present they enter the tubers via the stolons; also endophytes penetrate the roots from the germinating seed and are inherited. The ambient surroundings have an important effect on the cultivation of strongly or weakly mycotrophic plants. By studying these conditions seed material incorporating endophytes can be obtained, which will produce plants resistant to virus and other diseases.

Kosmakova (Mme V. E.) & Reĭfman (V. G.). Материалы к вопросу о физиологии и биохимии здорового и вырожденного Картофеля. [Data on the physiology and biochemistry of the healthy and degenerate Potato.]—*Ex* Биологические Ресурсы Дальнего Востока [Biological Resources of the Far East], pp. 140–147, Moscow, Acad. Sci. U.S.S.R., 1959.

Experiments by the Far Eastern Branch, Acad. Sci. U.S.S.R., in 1954–55 showed that potato plants infected by rugose mosaic [potato virus Y often combined with virus X: cf. **39**, 337] are less resistant to adverse effects of the ambient surroundings, and therefore their metabolism is easily disturbed. Disruption of the carbohydrate metabolism in infected plants is especially apparent at higher temp. and the possible connexion is the object of further studies.

Willis (C. B.) & Larson (R. H.). **A new host for Potato virus X in the Leguminosae.** —Abs. in *Phytopathology*, **50**, 9, p. 659, 1960.

The crimson clover (*Trifolium incarnatum*) vars. Chief and Dixie were shown to be hosts of the ringspot and yellows strs. of potato virus X. Systemic symptoms were a slight interveinal mottle followed by chlorosis and finally veinal necrosis. Both strs. were recovered unchanged after 4 months. A field str. also caused systemic infection.

Kollmer (G. F.) & Larson (R. H.). **Host range, properties, varietal reaction and resistance in relation to isolates of Potato virus F.**—Abs. in *Phytopathology*, **50**, 9, p. 642, 1960.

In certain American potato vars. sap inoculation with 3 strs. of virus F [potato aucuba mosaic virus str.: **38**, 386; **39**, 730] induced severe top necrosis, while 4 others caused only a systemic mosaic with some necrotic spotting. The host range was extended to include *Trifolium incarnatum* and *T. subterraneum*. *Solanum chacoense* and some of its interspecific hybrids were resistant. The thermal inactivation point in tobacco sap was 65–70° C., longevity *in vitro* up to 90 days, and the dilution endpoint between 1:100,000 and 1:1,000,000.

Köhler (E.). **Infektionsversuche mit dem Kartoffel-A-Virus (Stamm 'Magna 556') an Nicotiana glutinosa und einigen anderen Wirten.** [Inoculation experiments with Potato virus A (str. 'Magna 556') on *N. glutinosa* and some other hosts.] —*Zbl. Bakt.*, Abt. 2, **113**, 19–21, pp. 600–611, 2 fig., 1960.

Confirmation of the susceptibility of *N. glutinosa* to potato virus A [**38**, 332, 485]

was obtained by carborundum inoculation of the leaves. Only a few lesions developed on the lower leaves of plants 10–15 cm. high and the spread of symptoms to the upper part of the shoot was generally long delayed. Younger plants, however, were highly susceptible, many necroses being formed on the inoculated leaves and the rest of the shoot becoming rapidly involved. A particularly striking feature was the wilting of the leaves, attributed to a mechanical obstruction of the water supply arising from a substance extruded from the cells of the necrotic tissues which renders the vessels more or less impermeable, rather than to a wilting toxin *sensu stricto*.

Solanum racemigerum also proved susceptible to the virus, though the symptoms were very inconspicuous. The length of the latent phase was about 6 hr. and that of the 'generation period' [Köhler, **38**, 487] 17. In *Datura metel* infection remained latent: the sap of this sp. exerted a strong inhibitory action on infection by potato virus A [cf. **39**, 399].

Sokolova (Mme M.). Устойчивость гибридов Картофеля к фитофторе. [The resistance of Potato hybrids to *Phytophthora*.]—Картофель Овощи [*Kartofel' Ovoshchi*], **5**, 6, pp. 30–32, 1960.

In 1957–8 at Inst. for Potato Growing, U.S.S.R., *Solanum semidemissum* × potato hybrids were tested against *S. demissum* × potato hybrids for resistance to *P. [infestans*: cf. **37**, 592: **40**, 61]. In 1957 the resistant hybrid No. 208 (*S. semidemissum* × Smÿslovskiĭ) × resistant Aquila produced progeny with 66·7% resistant plants, while No. 208 × the susceptible Priekul'skiĭ rannīĭ produced 34·1%.

Guzmán N. (Julia), Thurston (H. D.), & Heidrick (L. E.). **Nature of partial resistance of three species of Potatoes to Phytophthora infestans.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

In the course of developing a test for breeding material in Colombia lesions on a clone of *Solanum andigenum* with low resistance to race 0 of *P. infestans* produced sporangia after 5 hr. in a moist chamber, but those on a highly resistant clone required 11 hr. and lesions were smaller and fewer [cf. **40**, 3].

Shell process oil 1211 for Potato blight sprays. *Shell agric. Bull.* ADB: 761/Me-1, 7 pp., 4 fig., [? 1960].

A description of a non-phytotoxic and non-irritant carrier oil suitable for mixing with fungicides [cf. **38**, 218] used in aerial or ground spraying against potato blight [*Phytophthora infestans*].

Line (R. F.) & Eide (C. J.). **Control of Potato seed-piece decay.**—*Plant Dis. Reptr*, **44**, 9, pp. 698–701, 1960. [8 ref.]

At Inst. Agric., Univ. Minn., St. Paul, better protection against decay by *Fusarium* [**38**, 245] and *Erwinia* spp. [**39**, 79] was obtained by dipping the seed-pieces in maneb (1 lb. 10 gal. water) than in agrimycin or a mixture of these. Cut potato seed-pieces gave lower yields if stored for several days after inoculation and dipping in the fungicides.

Sluijsmans (C. M. J.). **Kalibemesting en magnesiumgebrek bij Aardappelen.** [Potassium fertilizing and magnesium deficiency in Potatoes.] –*Kali*, **4**, 39, pp. 331–335, 3 graphs, 1960.

The results of experiments on 60 fields of Voran potatoes on sandy soils and 16 on reclaimed moorland in various parts of the Netherlands demonstrated the mutual antagonism of K and Mg in the soil amendment scheme. Treatment with 220 kg. K/ha. resulted in an aggravation of Mg deficiency symptoms and a decrease of Mg in the foliage, but these effects were important only where the soil content was

< 20 mg. MgO/kg. In general, it should suffice to add 25 kg. MgO to the normal quantity for every excess 100 kg. K_2O.

Reĭfman (V. G.). Изучение ржавости Картофеля в Приморском крае. [A study of internal rust of Potato in the Primor'e area.]—*Ex* Биологические Ресурсы Дальнего Востока [Biological resources of the Far East], pp. 124–139, 1 fig., 1 graph, Moscow, Acad. Sci. U.S.S.R., 1959.

The principal cause of internal rust was determined at Lab. Plant Physiol., Far Eastern Branch, Acad. Sci. U.S.S.R., to be disruption of the P metabolism, due to P deficiency [cf. **33**, 252; **35**, 710] in the soil. Affected parts consist of suberized tissue, but the symptoms vary with the var. In Berlichingen affected parts frequently spread and coalesce to form large irregular areas of necrotic tissue. In Rosafolia there are minute separate brown inclusions in the healthy tissue. Microscope observation showed that brown coloured cells were dead, possessed a thickened wall impregnated with suberin, and had broken granular remnants of protoplasm; there were hardly any starch grains in affected cells. Groups of cells (3–5 layers) also without starch grains surrounded the affected areas. Soil enrichment is advocated as a control, including the creation of a good tillage layer by crop rotation, new soil treatment methods, the use of organic fertilizers and liming.

Martin (W. J.). **Analysis for internal cork virus (ICV) in serial nodes of Sweet Potato stems.**—Abs. in *Phytopathology*, **50**, 9, p. 645, 1960.

By establishing plants from individual nodes of stems growing from infected roots it was demonstrated that the virus is not uniformly distributed in sweet potato tissue, and that virus-free clones may be obtained from infected plants [cf. **39**, 733].

Hildebrand (E. M.) & Brierley (P.). **Heat treatment eliminates yellow dwarf virus from Sweet Potatoes.**—*Plant Dis. Reptr*, **44**, 9, pp. 707–709, 1960.

At the U.S. Dept Agric., Beltsville, Md, sweet potato plants infected by yellow dwarf virus [**38**, 178] were symptom-free after 3 months at 38° C. The same treatment practically eliminated leaf spot symptoms of the internal cork [virus] syndrome.

Stahmann (M. A.), Uritani (I.), & Tomiyama (K.). **Changes in Potato proteins induced by fungus infections.**—Abs. in *Phytopathology*, **50**, 9, p. 655, 1960.

By means of immunochemistry, gel electrophoresis, column chromatography, and ultracentrifugation it was shown that inoculation of a resistant sweet potato var. with *Ceratocystis fimbriata* [**39**, 440] resulted in the production of 2–5 new antigens, 1 of which was a peroxidase. Protein metabolism appeared to be changed in the host cells next to the infected area but not in direct contact with the pathogen. Changes in a susceptible var. were less marked.

Cutting and inoculating potato tubers with *Phytophthora infestans* altered the protein elution pattern and increased the activity of peroxidase and other oxidative enzymes in cells adjacent to the infected area [cf. **39**, 731].

Riggenbach (A.). **Report of the Plant Pathology Department.**—*Rep. Rubb. Res. Inst. Ceylon, 1959*, pp. 52–58, 1960.

In 1959 climatic conditions did not favour the development of *Oidium* [*heveae*: cf. **39**, 343], and the routine application of adequate control measures resulted in a comparatively light incidence in most areas. Electrodusting[cf. **39**, 209, 214] in 2 experiments did not give better control than ordinary dusting, but spraying with a Mistral III AB sprayer and water-soluble and oil-based Cu formulations gave encouraging results in 2 other experiments. The incidence of *Phytophthora* [*palmivora*] during the S.W. monsoon was the highest so far recorded in Ceylon; small-

scale experiments indicated that it may be possible to reduce fruit set (and with it the amount of inoculum present) by the use of chemicals which cause flower drop, but the margin between the conc. needed for this and that causing leaf damage is very small.

YEN (W. Y.). **Studies on Cercospora diseases of Sugarcane.**—*Proc. centen. bicenten. Congr. Biol. Singapore 1958*, pp. 299–311, 2 fig., [? 1959. Received Sept. 1960].

The occurrence and symptoms are given of *Leptosphaeria taiwanensis* [**35**, 634], the most prevalent in Formosa, *C. atrofiliformis* [**36**, 729], *C. saccharicola* [**36**, 730], causing 'ring spot' symptoms and possibly a forerunner of *L. sacchari* present as a saprophyte, *C. rubropurpurea* [loc. cit.], *C. kopkei* [cf. **38**, 99], and *C. vaginae*, of minor importance.

SARKAR (A.). **Comparative studies of two races of Colletotrichum falcatum Went.**—*Sci. & Cult.*, **26**, 2, pp. 83–84, 1960.

The light and the dark races of *C. falcatum* [*Glomerella tucumanensis*: cf. **39**, 73, 373] isolated at Sta. agric. Res. Inst., Calcutta, from sugarcane vars. Co. 313 and Co. 527, respectively, differed from each other in morphological character; the former, more rapidly growing, produced only pinkish acervuli with conidia 20·9–34·2 (av. 25·3) μ long, the latter dark grey acervuli with conidia 16–20 × 4–5·2 (av. 18 × 4·8) μ and perithecia in dark grey stromatic masses. Temp. and pH requirements were equal in both races.

VENKATA RAM (C. S.). **Report of the plant pathologist (1959–1960).**—*Rep. Tea sci. Dep. un. Pl. Ass. S. India, 1959–60*, pp. 19–32, 1960.

Interesting diseases recorded in this report [cf. **39**, 123] [much of which is covered in the papers noticed below] include *Botryodiplodia theobromae* [**35**, 550] on young vegetatively propagated plants in the field and *Hypoxylon vestitum* causing stump rot.

A sp. of *Dothiorella*, probably undescribed, caused severe die-back of *Grevillea robusta* on several estates. Several plants of *Albizzia moluccana* were killed by *B. theobromae*.

Proceedings of the Seventh Annual Conference of the Scientific Department of the United Planters Association of Southern India, 1960.—*Bull. un. Plant. Ass. S. India* 19, 86 pp., 4 pl., 2 graphs, 1960.

Two papers are of plant pathological interest:

JAYARAMAN (V.). 'Retention and efficacy of copper fungicides sprayed on Tea leaves under the influence of simulated rainfall' (pp. 8–17). In further artificial rainfall experiments in the field [**39**, 123] more than 70% of the Cu in freshly applied fungicides was washed off in $\frac{1}{2}$ min. by rain at the rate of 12 in./hr. At 1–2 in./hr. less Cu was washed off after 15 min. than in $\frac{1}{2}$ min. at 12 in./hr. The biological efficacy of the fungicides was scarcely reduced by 1–2 in./hr. for 15 min. but was reduced to zero by 12 in./hr. for $2\frac{1}{2}$ min. In field experiments satisfactory control of blister blight [*Exobasidium vexans*: cf. below] was given by fungicides containing 50% metallic Cu, even when applied during rain.

VENKATA RAM (C. S.). 'A reassessment of the Diplodia root disease of Tea plants' (pp. 18–27). After summarizing past views on the part played by *Botryodiplodia theobromae* [cf. above] in this disease the author reports that 4 months after soil inoculation potted tea seedlings and stump plants were severely infected, 60–80% of the lateral roots bearing typical dark-brown necrotic lesions. Depletion of starch reserves in infected roots appeared to be a consequence of infection rather than a predisposing factor, as has been suggested.

VENKATA RAM (C. S.) & JAYARAMAN (V.). **The relationship of interval and rate of application of antibiotics, copper and organic fungicides to the infection of Tea plants by Exobasidium vexans Massee.**—*Rep. Tea sci. Dep. un. Pl. Ass. S. India, 1959–60*, pp. 36–48, 1 graph, 1960.

The results of a series of spraying trials with 15 fungicides in 1959 are presented. Adequate protection against *E. vexans* [**39**, 123] was afforded by perenox, Cu Sandoz, and agrimycin 500 at 14-day intervals. Agrimycin 500 containing 35·3% Cu was superior to Cu Sandoz at 3 oz. Cu/acre.

VENKATA RAM (C. S.). **Fungi causing stalk-rot and failure of Tea cuttings in vegetative propagation nursery beds and their control.**—*Rep. Tea sci. Dep. un. Pl. Ass. S. India, 1959–60*, pp. 59–62, 1960.

During the past 2 yr. isolations from diseased stalks of cuttings yielded *Colletotrichum camelliae* [*Glomerella cingulata*: **38**, 34] and *Pestalotia theae* [**39**, 123], both of which reproduced stalk rot in soil inoculations. It is suggested that infection may take place by soil-borne spores. More healthy rooted cuttings (19–24 30) were obtained by treating the soil round each cutting with captan, cyprex, blitox 50, or agrimycin 500.

VENKATA RAM (C. S.). **Tea plant and control of root diseases, 1. In situ action of soil fungicides on Fomes noxius, Rosellinia arcuata and Ustulina zonata.**—*Rep. Tea sci. Dep. un. Pl. Ass. S. India, 1959–60*, pp. 66–77, 3 fig., 1 graph, 1960. [45 ref.]

In field and pot trials with 6 fungicides chlorobromopropene, D-D, formaldehyde, and vapam were effective in eradicating *F. noxius*, *R. arcuata* [**37**, 678], and *U. zonata* [**34**, 67] mycelium from tea root segments inoculated and buried in soil. High rates of application of vapam sufficient to eradicate soil fungi were not phytotoxic to mature tea plants.

BAUDIN (P.). **Maladies du Tabac dans le Betsiriry.** [Diseases of Tobacco in Betsiriry.]—*Docum. Inst. Rech. agron. Madagascar* 2, 31 pp., 2 graphs, 1 map, 1960. [Cyclostyled.]

Full notes are given on the diseases which affected tobacco in the Betsiriry region of W. Madagascar in 1959, their symptoms, causes, and control, and the damage they cause. The season was exceptionally dry, in contrast to the floods and rains of the previous year.

Seedlings were affected by damping-off (*Pythium* spp., *Rhizoctonia* [*Corticium*] *solani*, or *Cercospora nicotianae* [map 172]).

In the field leaf-spotting by *Oidium* sp. (the perfect state of which was not identified) was confined to a few localities. *C. nicotianae* caused mostly insignificant damage to seedlings after watering; it usually occurs in the barn-spot phase [cf. **37**, 421, *et passim*]. *Fusarium* wilt [cf. **38**, 36, 656] (*F.* ? *oxysporum* f. *nicotianae*) was widespread in areas with light soils, and absent from others. A minor wilt in 1 locality was associated with a fungus resembling *Phytophthora* [*parasitica* var.] *nicotianae*, but not identical with it. N and B deficiencies were noted. Numerous instances of frenching [cf. **37**, 376 *et passim*] occurred, but in general no losses were sustained, though some were caused by tobacco leaf curl virus [**14**, 686], favoured by the drought, and which spread rapidly. Tobacco mosaic virus is never serious in Madagascar on Maryland tobacco, though Burley Cahors appears to be more susceptible.

In the drying-sheds leaves are commonly destroyed by various fungi of which *C. nicotianae*, causing 'green spot', is the most important, though losses from this disease were very small. In one locality there were heavy losses of leaves in the

yellowing stage and *Rhizopus nigricans* [*R. stolonifer*] was present on living tissues though not spreading from leaf to leaf. The etiology of the disease is at present unknown, but *R. stolonifer* does not appear to play an important part.

Svobodová (Jarmila). **A new strain of Tobacco mosaic virus caused by influencing the metabolism of the host.**—*Biol. Plant Acad. sci. bohemosl.*, **1**, 2, pp. 113–122, 1959. [Czech., Russ. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 16, p. 50, 1960.]

Tobacco and tomato plants grown aseptically in Erlenmeyer flasks on minimal agar medium in reduced daylight and limited air were inoculated with str. A1 of TMV [**39**, 498]. After a while the virus was transferred to tobacco (or tomato) plants in normal conditions in pots. These subsequent passages were repeated a number of times. Eventually a new str., S, appeared, characteristic symptoms of which in tobacco leaves were bright bands having dark rings inside and bright areas along the veins. Str. S persistently retained its character in tests over 6 yr. with numerous transfers under different conditions and to different hosts.

Townsley (P. M.). **The in vitro incorporation of phosphorus-P^{32} into Tobacco mosaic.**—*Canad. J. Biochem. Physiol.*, **38**, 5, pp. 459–466, 5 fig., 1960.

Further studies at the Univ. B.C., Vancouver [cf. **38**, 585], showed that tobacco mosaic virus can be labelled with P^{32} [**40**, 92] during homogenization of the diseased tissue of tobacco var. Haronova with a soluble phosphate compound, which was stable to incubation for a minimum of 1 hr. at 0° and 2 min. at 80° C. The label remains associated with the virus during purification and can be isolated from it by incubation in KOH.

Hare (W. W.) & Lucas (G. B.). **Some effects of pH and milk on Tobacco mosaic virus.**—Abs. in *Phytopathology*, **50**, 9, p. 638, 1960.

In further experiments [cf. **38**, 543] certain components of milk [cf. **40**, 126] inactivated TMV at pH 9–11 but not at pH 6–7. Half-leaves of Havana 425 tobacco were inoculated with the virus suspended in 6 different bases over a pH range 6·4–11·4. Most lesions were produced at pH 6–7, and hardly any above 10. In acetic acid at pH 3·1 very few lesions developed. When mixtures at either high or low pH were diluted the virus was not recovered, but when milk-inactivated TMV at pH 6·7 was diluted nearly all the virus was recovered.

Ross (A. F.) & Bozarth (R. F.). **Resistance induced in one plant part as a result of virus infection in another part.** Abs. in *Phytopathology*, **50**, 9, p. 652, 1960.

Lesions of tobacco mosaic virus produced by inoculating the 2nd half of previously inoculated leaves of Samsun NN tobacco were consistently smaller and fewer than those on the controls inoculated only once. TMV infections on lower leaves of decapitated plants induced resistance in upper leaves and vice versa. This protective effect depended on the ratio of the 2 inoculated areas, the number of lesions induced by the 1st inoculation, and the time lapse between inoculations; it was first noticeable after 3 days, reached a max. in 7 days, and persisted for 20 days. Resistance was induced in detached leaves, darkened plants, and in plants of differing vigour. The effect was not specific; tobacco necrosis virus behaved similarly, resistance induced by both viruses being highly effective against TMV and moderately so against TNV.

De Montgremier (H[élène] A.) & Grosclaude (C.). **Rôle et importance du virus de la mosaïque du concombre dans une 'nécrose des nervures du Tabac' observée dans le sud-ouest de la France. Préparation d'un immunserum.**

[Significance and importance of cucumber mosaic virus in tobacco vein necrosis observed in S.W. France. Preparation of immune serum.]—*Coresta*, **1**, pp. 3–14, 4 fig., 1959. [Fr. and Engl. text. 15 ref.]

A vein necrosis of tobacco in S.W. France differed from that previously described from Europe [cf. **37**, 312; **39**, 243] and Brazil, in being caused by a mixture of cucumber mosaic virus (CMV)+potato virus X or tobacco mosaic virus. The necrosis affected the tops of the plants, causing dwarfing; the lesions sometimes extended along the leaf veins as far as the stalk.

A virulent str. of CMV obtained from a Paraguay tobacco plant induced leaf distortion in *Nicotiana glutinosa*. A serum prepared from *Antirrhinum* infected with this str. reacted positively to tobacco, *N. glutinosa*, cucumber, and tomato infected with the virus.

Valleau (W. D.), Stokes (G. W.), & Johnson (E. M.). **Nine years' experience with the Nicotiana longiflora factor for resistance to Phytophthora parasitica var. nicotianae in the control of black shank.**—*Tobacco, N.Y.*, **150**, 20, pp. 20–22 (Sect. *Tobacco Sci.*, 4, pp. 92–94), 1960. [*Biol. Abstr.*, **35**, 17, p. 4243, 1960.]

At Ky agric. Exp. Sta., Lexington, *N. longiflora* [**36**, 668] proved highly resistant to field strs. of the fungus. The resistance factor was transferred to Burley tobacco and, for a time, completely controlled the disease in the field. Eventually, 3 strs. of the fungus were found to which all these were highly susceptible. *N. plumbaginifolia* [loc. cit.] (almost identical with *N. longiflora*) was resistant to the ordinary field strs. but susceptible to the virulent.

Averre (C. W.) & Kelman (A.). **Virulence of Pseudomonas solanacearum as influenced by proportion of virulent to avirulent cells.**—Abs. in *Phytopathology*, **50**, 9, pp. 627–628, 1960.

Cell suspensions of virulent fluidal and avirulent butyrous colonies [cf. **40**, 14] from tobacco mixed in the proportions 100 : 0, 50 : 50, 5 : 95, 0·5 : 99·5, and 0 : 100 were used to inoculate susceptible Bottom Special plants. Virulence depended on the proportion of virulent cells in the inoculum, and was not directly related to the pathogenicity of the most virulent cells present.

Smiley (J. H.) & Stokes (G. W.). **Population studies of Pseudomonas tabaci in diploid, triploid, and tetraploid Nicotiana tabacum plants with different doses of the Nicotiana longiflora gene for resistance.**—Abs. in *Phytopathology*, **50**, 9, p. 655, 1960.

In 3 diploid (with 0, 1, and 2 genes for resistance to *P. tabaci*), 4 triploid (0, 1, 2, 3), and 3 tetraploid (0, 2, 4) tobacco plants bacterial populations reached a peak 4 days after inoculation and were inversely related to the number of these genes. There was a direct correlation between the number of viable bacteria recovered and the symptoms observed.

Taylor (G. S.), De Roo (H. C.), & Waggoner (P. E.). **Moisture and fleck of Tobacco.**—*Tobacco, N.Y.*, **150**, 14, pp. 22–28 (Sect. *Tobacco Sci.*, 4, pp. 62–68), 1960. [*Biol. Abstr.*, **35**, 16, p. 3984, 1960.]

At Conn. agric. Exp. Sta., New Haven, detached wilting leaves of a shade var. of tobacco were resistant to the toxicant, presumably ozone [cf. **38**, 423], in UV irradiated air. 'Weather fleck' [cf. loc. cit.] following smog was considerably less in Broadleaf when soil moisture stress was $\frac{1}{2}$–2 atm. than when it was $\frac{1}{3}$–$\frac{1}{2}$, and this gave 10% increase in fresh wt. of shoots. If soil moisture was depleted by almost 30% and not restored to field capacity 4 days before smog, shade tobacco in a tent developed markedly less 'fleck'.

MARTIN (P.). **Les maladies des Tomates de serre.** [The diseases of glasshouse Tomatoes.]—*Rev. Oka*, **34**, 3, pp. 74–80, 1960.

Brief notes are given in popular terms on the symptoms and control of diseases of glasshouse tomatoes in Canada, including fungus (12), virus (3), and bacterial diseases (2), and physiological disorders (4). Most of the information presented has been noticed [cf. **35**, 158; **37**, 599, *et passim*].

MCRITCHIE (J. J.). **Four pathogenic strains of TMV on Tomato.**—Abs. in *Phytopathology*, **50**, 9, p. 645, 1960.

Four strs. of tobacco mosaic virus which produce typical mosaic symptoms on Bonny Best tomatoes were differentiated on the basis of pathogenicity to other *Lycopersicon* hosts. *L. esculentum* C St MW-18 was visibly susceptible only to str. 3, *L. peruvianum* PI 126945 to strs. 3 and 4, and *L. p.* 127832 to str. 4. In *Nicotiana sylvestris* strs. 1, 2, and 3 protected against 4, and in *N. longiflora* str. 3 protected against the other strs. The RNA fraction of each str. and TMV reconstituted from the protein and RNA fractions in all possible combinations were infective.

ALEXANDER (L. J.). **Inactivation of TMV from Tomato seed.**—Abs. in *Phytopathology*, **50**, 9, p. 627, 1960.

Tobacco mosaic virus was recovered from tomato seed [**39**, 247] after 3 yr. storage. Soaking seed up to 30 min. in 10% Na_3PO_4 alone or with commercial detergents reduced the amount of virus but did not eliminate it. Extraction of seed from mature infected fruits with conc. HCl (10 ml./25 lb. pulp) resulted in virus-free plants (27 infected among 900 from fermented seed). In later work HCl gave total inactivation only if the fruits were ripe and the seed completely separated.

MURAKISHI (H. H.). **Diagnostic aids in distinguishing internal browning and gray-wall of Tomato.**—Abs. in *Phytopathology*, **50**, 9, p. 648, 1960.

Mature green to ripe tomato fruits with internal browning caused by tobacco mosaic virus (TMV) strs. developed dark sunken areas on the shoulders. Fruits with grey wall (due to low light intensity) [**40**, 63] had smooth shoulders, but necrotic streaks in the vascular region extending to the stylar scar were often visible through the epidermis. A rapid method of indexing for TMV was by rubbing tomato leaves or cut fruits on leaves of Xanthi tobacco.

HAYSLIP (N. C.), WALTER (J. M.), & KELBERT (D. G. A.). **Indian River, a new disease-resistant Tomato of general adaptability.**—*Circ. Fla agric. Exp. Stas.* 5–111, 11 pp., 5 fig., 1958.

This new var. possesses resistance to *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici*, *Stemphylium solani* [**38**, 545], *Alternaria solani* [**39**, 48], and 4 races of *Cladosporium fulvum* [**36**, 801], as well as to grey wall [see above], blossom-end rot, and crease stem [**36**, 282].

DIMOND (A. E.) & EDGINGTON (L. V.). **Mechanics of water transport in healthy and Fusarium-wilted Tomato plants.**—Abs. in *Phytopathology*, **50**, 9, p. 634, 1960.

From hydraulic calculations it was established that if plugging due to *F.* [*bulbigenum* var. *lycopersici*] decreases the effective radius of a large vascular bundle in a tomato stem by 50% over a distance of 2 nodes a pressure increase of only 3% is sufficient to maintain the water flow. In petiole bundles with no by-passes the same reduction demands a 1,600% increase in pressure, thus the leaf tissue wilts although flow up the stem remains relatively undisturbed.

GRANT (B. R.) & KUC (J.). **On the resistance of Tomato varieties to Cladosporium fulvum.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

Mineral media containing 2 g./ml. of extracts of fresh tomato leaf and stem tissue, homogenized, extracted with benzene, and dried, were inoculated with spores of race 1 of *C. fulvum*. Dry mat wt. after 20 days' growth was stimulated 1,000% by extracts of the susceptible vars. Potentate and Michigan State, and inhibited 90–100% by those of the resistant Vinequeen and Red Currant (*Lycopersicon pimpinellifolium*). The inhibitory activity of Vinequeen extract was destroyed by autoclaving and by freezing but not that of *L. pimpinellifolium*.

ELENKOV (E.). Ефикасни химически средства за пръскане на Доматите срещу листната плесен (**Cladosporium fulvum Cooke**). [Effective chemical substances for spraying Tomato against leaf mould (*C. fulvum*).] -Селскост. Мисъл [*Selskost. Misŭl*], **3**, 11, pp. 833–840, 1958. [Abs. in *Referat. Zh. Biol., 1960*, 12, p. 206, 1960.]

At Plovdiv sci. Res. Inst. Veg. Crops in 1955–58, 19 Bulgarian and foreign preparations were tested in the open against inoculation with *C. fulvum* [**39**, 12] and natural infection. Spots on tomato leaves were reduced 36–37% by 6–8 sprays of 1% Ba solution to which liquid soap (by-product of the cellulose-paper industry) was added at 200 g./l. Cu oxychloride (1% suspension) + DIP 'agriya' wetter gave the best results, the number of leaf spots being reduced by 82·95% compared with the untreated, and by 67–92% compared with plants treated with 1% Ba.

KNIGHT (DOROTHY E.). **Studies on Didymella lycopersici Kleb., the causal fungus of stem rot disease of Tomatoes.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 519–522, 1960.

At Nat. Veg. Res. Sta., Wellesbourne, Warwick, isolates of pycnidial fungi from lesions on tomato stems and fruit fell into 2 groups, pathogenic to stems and fruit, and pathogenic to fruit only. The former proved to be the imperfect state (*Diplodina lycopersici*) of *Didymella lycopersici* [**40**, 64], the latter mostly *Phoma destructiva*. Differences in appearance of the colonies derived from the spores of 1 ascus suggest that *D. lycopersici* is heterothallic.

STALL (R. E.). **Alteration of the incidence of Botrytis cinerea on Tomato by liming the soil.**—Abs. in *Phytopathology*, **50**, 9, pp. 655–656, 1960.

The amount of fruit rot due to *B. cinerea* was 9·16% in a plot treated with 600 lb. hydrated lime/acre to give pH 5, 2·31% with 3,000 lb. (pH 6), and 0·98% with 9,000 lb. (pH 7). These results were not affected by spraying the plants with a mixture of micro-elements or with Mn alone. Plant vigour and yield were about the same with all treatments.

SINCLAIR (J. B.) & BROWN (R. T.). **The effect of calcium and molybdenum on yields and blossom end rot of Tomato.**—Abs. in *Phytopathology*, **50**, 9, p. 655, 1960.

The marketable yield of Morton hybrid was slightly reduced by 4 sprays of $CaCl_2$ (88·8 g./4 gal. water) or Na molybdate (1 g./4 gal.) at weekly intervals from the appearance of the 1st fruit cluster but both treatments significantly reduced blossom end rot [**38**, 488].

Report on forest research for the year ended March, 1959.—ix+186 pp., 2 pl., 9 graphs, 2 maps, London, H.M. Stationery Office, 1960.

In the forest pathology sect. (pp. 67–70) [cf. **38**, 711] T. R. PEACE states that *Lophodermium pinastri* caused serious loss of nursery stock in 1958; in 1 Conservancy over 2,000,000 diseased plants were destroyed. Attacks on seedlings were almost

entirely confined to nurseries in pinewoods, where intensity of infection diminished with distance from surrounding pine.

Inoculations of potted pine plants with the fungus causing browning of pine needles at Wareham [**38**, 714] confirmed its pathogenicity; it appeared to be identical with *Dothistroma pini* [**21**, 275]. Pine seedlings and transplants from 6 nurseries in N. and E. Scotland with browning of needles, the shoots dying during the growing season, were infected by *Asochyta piniperda* [cf. **36**, 290]. Further investigations into the group dying of conifers caused by *Rhizina inflata* [**36**, 793] showed that burnt areas caused by fires lit at any time of the yr. could be colonized by the fungus. In fungicidal trials substances containing Cu gave some control of *Keithia* [*Didymascella*] *thujina* [**37**, 745; **38**, 713], which continues to cause heavy losses in nurseries throughout Great Britain. In an experimental test bed at Alice Holt, Surrey, infection by *Melampsora pinitorqua* [cf. **38**, 714] occurred on *Pinus sylvestris*, *P. pinaster* (severely). *P*[*opulus*] *tremula* (some clones), and *P. tremula* × *tremuloides* (very slightly) in 1958, whereas American aspens and 7 other *Pinus* spp. were uninfected. In a test bed of currant vars. and spp. of 5-needled pines only selected clones of *P. strobus* [cf. **39**, 748] from America were all uninfected by *Cronartium ribicola* [**36**, 799]; only 1 of 22 individuals of *P. peuce* became infected. Losses in nursery larch due to *Meria laricis* [**38**, 714] were reported, especially from N. Scotland. The development of *Fomes annosus* [**39**, 633] appears to be restricted on old hardwood sites planted with conifers and on acid peat soils.

Investigations at Bedford Coll., London, by Ida Levisohn & M. E. Parry (pp. 91–94) disclosed that an intracellular haustorial infection is common in good quality seedlings of certain tree species growing in sterilized nursery soil of the agricultural type. Such infection is not identical with the form of intracellular infection in sub-standard seedlings growing in the same soil not sterilized. In roots from sterilized soil there is a noticeable digestion of the haustorial mycelium within the cortical cells, not present in material from untreated soil. Antibiotic effects due to *Alternaria tenuis* [cf. **36**, 624] were demonstrated *in vitro* on several more mycelia known to form mycorrhiza, e.g. *Boletus badius* and *B. luteus*, but a group of mycorrhiza-formers very active as free-living mycelia, e.g. *B. subtomentosus* and *Mycelium radicis nigrostrigosum*, were not affected, nor were *Verticillium* or *Pythium* spp. Some fungi causing timber decay, e.g. *Armillaria mellea*, *F. annosus*, *Pleurotus ostreatus*, and *Polyporus betulinus* were markedly inhibited on a synthetic medium.

The growth of Scots pine seedlings in soil pits increased after inoculation with *Tricholoma albobrunneum*. Mycelium like those of *M. radicis nigrostrigosum*, *Rhizopogon luteolus* [**40**, 67], and a str. of *B. scaber* [**38**, 715] which stimulated the development of certain tree spp. before (or even without) forming root associations, gave a negative reaction in chemical tests [loc. cit.], whereas those without vigorous rhizosphere activity, e.g. *B. bovinus*, gave a positive reaction. This suggests that such fungi might be roughly sorted out by this method.

Studies at the Univ. Coll. N. Wales by C. G. Dobbs, Joan Bywater, & D. A. Griffiths (pp. 94–100) with samples of 12 soils demonstrated that wherever mycostasis [loc. cit.] was present at normal temps. it was completely removed by temps. above blood heat and below freezing point. The sterile, chrome-washed sand used as a control retained its non-inhibiting character only when stored in clean, sealed containers. Exposed to the air of the laboratory it gradually recovered inhibiting power, the 1st reduction in percentage germination being detectable after 1 week. Such exposed sand when plated out on nutrient agar gave rise to bacterial colonies. This control sand, inoculated with $\frac{1}{100}$ of its vol. of untreated soil or sand, rapidly recovered its inhibiting power, usually within 1 week. A close correspondence was noted between the sugar content of soil samples and germination percentage of spores of *Mucor ramannianus*, strongly mycostatic soils being almost

free from reducing sugars. Soil samples which on collection had a low mycostatic activity and a high sugar content lost their available sugars in 2–3 weeks in the laboratory and became strongly mycostatic.

J. G. Manners (Univ. Southampton) reports (pp. 111–112) that when potted European larch trees were inoculated with *Trichoscyphella willkommii* [loc. cit.] and exposed to local freezing dormant cankers were re-activated, the re-activation being associated with renewed fungal activity. No Japanese larch developed cankers; anatomical investigation showed that in all cases the original damage had healed, rapidly and completely. Ascospores of *T. willkommii* are liberated *in vitro* only at 100% R.H.

J. Rishbeth (Univ. Cambridge) states (p. 112) that spores [*F. annosus* [**39**, 251] may be detected at distances of over 200 miles from their source. G. Wallis (Univ. Cambridge) describes (p. 113) investigations into the incidence of *F. annosus* in relation to soil characteristics and forest management in an area of 7,000 acres, mainly of Scots pine. Damage in stands at the 1st thinning was virtually confined to lanes cut through the stand some years before. Killing was closely correlated with soil reaction in the major later rooting zone (15–35 cm.), the critical value being pH 6. Mean losses/acre on soil of pH < 6 did not exceed 5 cu. ft. or 1·8% of the total vol., even in 3rd thinnings. Mean losses/acre of 35 and 31 cu. ft., respectively, were recorded at the 3rd and 4th thinning in stands at pH > 7. Damage was high on former agricultural land only where liming had raised the pH to > 6; when it was < 6, no difference in loss was apparent between stands on former arable land and those on *Calluna* heath. Damage was severe in many stands on calcareous grass-heath with a naturally high soil reaction. Infection by *F. annosus* had become stabilized by the age of 25 yr. in stands on former *Calluna*-heath, though damage was still occurring in many older plantations on alkaline soils. Losses from *F. annosus* in pure stands of Corsican pine [*Pinus nigra* var. *calabrica*] were low, compared with those in Scots pine.

Lyubarskiĭ (L. V.). Эколого-географическая характеристика дереворазрушающих грибов Советского Дальнего Востока. [The ecological and geographical character of the wood-destroying fungi of the Soviet Far East.]—*Ex* Биологические Ресурсы Дальнего Востока [Biological Resources of the Far East], pp. 97–108, Moscow, Acad. Sci. U.S.S.R., 1959.

This is a detailed survey of occurrences in the area, where wood-destroying fungi are a serious problem. The author studied fungus diseases of forest trees from 1929–55 [**18**, 356 *et passim*] in the Primor'e and Khabarovsk areas, and in some years in the Amur and Sakhalin regions. There is some discussion of dissemination by insects and rodents, among other topics.

Bulatov (P. K.), Berezina (Mme M. P.), & Yakimov (P. A.) (Editors). Чага и ее лечебное применение при раке IV стадии. [The 'chaga' and its therapeutical use in stage IV cancer.]—334 pp., 23 fig., 30 diag., 24 graphs, Leningrad, Medgiz, 1959. [6½ pp. ref.]

This book contains some of the results of studies of the abortive sporophore of *Inonotus obliquus* [*Poria obliqua*: **39**, 628] undertaken as a joint research project by V. L. Komarov bot. Inst., Acad. Sci. U.S.S.R., and I. P. Pavlov I Leningrad med. Inst. over a 6-yr. period from 1951. Among the papers contributed are 'The "chaga" and some of the most widespread polypores on birch' by A. S. Bondartsev, pp. 23–31, and 'Contributions to the biology of the causal agent of the "chaga" on birch' by Mme O. P. Nizkovskaya, pp. 32–35.

Berry (F. H.). **Relative resistance of some Chestnut species and hybrids inoculated with the blight fungus.**—*Plant Dis. Reptr*, **44**, 9, pp. 716–717, 1960.

Seedlings of 4 *Castanea* spp. and 15 hybrids (14 *C. mollissima* ×) were inoculated

with *Endothia parasitica* at U.S. Dept Agric., Beltsville, Md [cf. **32**, 459]. The most resistant (29% infected) was *C. mollissima* (Chinese chestnut); though *C. mollissima* × *C. dentata* (American chestnut) hybrids were 85% infected, in the F_2 this was reduced to 69%.

PEACE (T. R.). **The status and development of Elm disease in Britain.**—*Bull. For. Comm., Lond.* 33, 44 pp., 20 pl. (76 fig.), 1 map, 17 graphs, 1960. 10*s*. [3 pp. ref.]

The surveys for the disease (*Ceratostomella* [*Ceratocystis*] *ulmi*) in Britain [cf. **38**, 229], begun in 1928 [**7**, 289], are summarized. The disease is briefly described and compared with others with which it might be confused. Variability in the fungus and differences in host resistance are described, with particular reference to their influence on the general behaviour of the disease. The progress of the disease is considered in relation to the effect on the individual tree (with particular reference to recovery), local populations, and the country as a whole. A final chapt. covers control methods.

The disease seems to have declined continuously but erratically since 1936–7, both in the number of trees affected and, more particularly, in the severity of the damage. This may be connected with the wartime and post-war clearance of diseased elms for timber, which reduced the number of suitable breeding sites for *Scolytus* beetles (*S. scolytus*, *S. multistriatus*). Despite its early violence the total effect of the disease has been surprisingly small, the total loss probably being between 10 and 20% of tree elms. This is being made good by the growth of young sucker elms in hedges, and only in a few localities has the disease materially altered the landscape.

In view of the very frequent recovery of affected trees, the author is convinced that losses would have been much greater if diseased trees had been felled. The establishment of elms in hedgerows, particularly by the encouragement of suckers, is a perfectly reasonable method of renewal, though for the planting of ornamental avenues it might be best to await the results obtained with Dutch resistant selections [cf. **37**, 682].

Control should be limited to the removal of dead, moribund, or unsightly trees, and where possible dead branches. Unbarked logs and elm firewood should never be left close to living elms.

ARNOLD (B. C.). **Mycorrhizal infection of germinating seedlings of Nothofagus solandri var. cliffortioides (Hook f.) Poole.**—*Pacif. Sci.*, **14**, 3, pp. 248–250, 1960.

In further studies at Dept Bot., Univ. Canterbury, N.Z. [cf. **39**, 353], mycelial sheets of several [unidentified] fungi early covering the root surface of germinating seedlings of *N.s.* var. *cliffortioides* [*N. cliffortioides*] were found visibly to penetrate the cells only on the emergence of lateral roots. This penetration was preceded by radial elongation of epidermal cells. The envelopment of the root point with hyphae appeared to be necessary for the transformation of the root into a mycorrhiza.

HOUSTON (D. R.) & KUNTZ (J. E.). **The effects of temperature and moisture on Oak wilt development.**—Abs. in *Phytopathology*, **50**, 9, p. 640, 1960.

With equal and constant air and soil temps. 50% of the Chinese oak seedlings inoculated with *Ceratocystis fagacearum* [**38**, 229] wilted at 20° C. and 100% at 28°; none wilted at 16, 32 or 36° within 20 days. In culture *C. fagacearum* grew best at 24°. In full sunlight at 32° the pathogen developed readily in logs of northern pin oak, less so in burr oak, and occasionally and not at all, respectively, in trees of these 2 spp. Of 12 inoculated red oaks, 11 developed wilt in a well-watered situation, but only 1 of 9 when moisture was excluded for 2 weeks before and 1 week after inoculation.

Gillespie (W. H.) & Wilson (C. L.). **Limited saprophytic survival of the Oak wilt fungus, Ceratocystis fagacearum (Bretz) Hunt.**—*Plant Dis. Reptr*, **44**, 9, pp. 687–689, 1960.

In limited co-operative experiments between W. Va Dept Agric., Morgantown, and Ark. agric. Exp. Sta., Fayetteville, mat fragments of *C. fagacearum* [**39**, 54] survived for 70 days buried in forest litter under unfavourable conditions.

May (C.) & Davidson (R. W.). **Endothia parasitica associated with a canker of Live Oak.**—*Plant Dis. Reptr*, **44**, 9, p. 754, 1960.

A note on the occurrence of *Endothia parasitica* on *Quercus virginiana* in Colonial Williamsburg, Va [cf. **33**, 569; **40**, 66].

Hood (F. A.) & French (D. W.). **Bacteria in the perithecia of Hypoxylon pruinatum and their effect on ascospore germination and colony development.**—Abs. in *Phytopathology*, **50**, 9, p. 659, 1960.

The addition of 200 p.p.m. streptomycin to media for culturing ascospores of *H. pruinatum* from perithecia produced on *Populus tremuloides* showed that freshly ejected spores are contaminated by bacteria; germination was increased by reducing bacterial contamination. Of the stromata from 40 different trees 60% produced contaminated ascospores. Establishment of *H. pruinatum* in the wild may be affected by these bacteria.

Davidson (R. W.). **Several species of Pholiota associated with root and butt rots of Rocky Mountain conifers.**—Abs. in *Phytopathology*, **50**, 9, p. 633, 1960.

Soft white butt rots of *Abies lasiocarpa* and *Picea engelmannii* were associated with *Pholiota alnicola* (1st collected in 1959) and *P. squarrosa*, which is also found at the base of *Populus tremuloides*. These *Pholiota* spp. and *P. adiposa* [**36**, 564] can be distinguished in culture by growth rate, odour, and type of conidia.

Kamei (S.) & Igarashi (T.). **On the brown cubical butt rot of Larch, Firs and other conifers caused by Sparassis crispa (Wulf) Fr. in Japan.**—*Res. Bull. Exp. For. Hokkaido Univ.*, **20**, 1, pp. 77–92, 6 pl., 1959. [*For. Abstr.*, **21**, 2, p. 258, 1960.]

Windthrown timber after the typhoon of Sept. 1954 showed that many trees had been affected by butt rot caused by *Sparassis crispa* [cf. **36**, 221]. The spp. attacked were *Larix leptolepis*, *Abies mayriana*, *Picea jezoensis*, and *P. glehnii*; trees 30 yr. old or more, growing in natural stands or in plantations, were involved. Decay began in the lateral roots and extended to a distance of 3 m. up the trunk.

Ono (K.) & Yokota (S.). **An inoculation experiment of Fomitopsis annosa to Sakhalin Fir.**—*J. Jap. For. Soc.*, **41**, 12, pp. 495–497, 1959. [Jap. *Biol. Abstr.*, **35**, 16, p. 3982, 1960.]

F. annosa [*Fomes annosus*: cf. **37**, 743, 744], inoculated into the rootlets of Sakhalin fir [*Abies sachalinensis*] at For. Exp. Sta., Sapporo, spread to the main roots and the stem, causing rot up to 30 cm. and staining up to 1 m. above ground within 4 yr.

Ch'ên (L.-P.) & Ch'iu (T.-H.). **Fungi of Abies stands in the Ma-êrh-k'ang leskhoz, Szechwan Province.**—*For. Sci., Peking*, **2**, pp. 134–142, 1959. [*For. Abstr.*, **21**, 2, pp. 257–258, 1960.]

In stands of *A. fasconiana* and *A. recurvata* an av. of 78·6% of the trees (87·5% by vol.) are damaged by fungi. *Fomes annosus* [map 271] accounts for 19·7% of the damaged trees (18·6%) and *F. fomentarius* for 10·9% (14·1%). Damage is greatest in *Abies*/rhododendron stands and least in *Abies*/bamboo; the lower the site class, the older the stands, and the less their density the more extensive the damage, which is greatest on N.E. slopes and least on W. slopes. Timber yields are reduced by 69·5% by *Trametes abietis*; 22·5% by *F. annosus*; and 10·6% by *F. fomentarius*.

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AUTHORS' NAMES

Ablakatova, 142
Agnihothrudu, 137
Al-Azawi, 129
Alexander, 187
Al-Sohaily, 167
Arnold, B. C., 191
Arnold, W. N., 135
Arny, 164
Ashworth, 163
Averre, 186
Azbukina, 153
Bald, 135
Bancroft, 173
Barton, 156
Bateman, 157
Baudin, 184
Beachell, 167
Beck, 172
Beckman, 179
Bega, 130
Bell, 159
Berezina, 190
Berry, F. H., 190
Berry, R. W., 165
Blumer, 176
Bogacheva, 173
Bogusławski, 170
Boosalis, 163
Bos, 173
Boyce, 138
Bozarth, 185
Braun, 141
Braverman, 173
Brezhnev, 174
Brierley, 182
Brown, 188
Browning, 164
Bulatov, 190
Burdekin, 169
Burkholder, 151
Buxton, 137
Cameron, 176
Campbell, 132, 155
Carter, 177
Cation, 175
Ch'ên, 192
Cherednichenko, 179
Chi, 173
Ch'iu, 192
Ciferri, 140
Clinton, 138
Coïc, 163
Collier, 167
Collins, 163
Cornuet, 159
Corte, 140
Coursey, 153
Covey, 166
Da Costa, 133
Dadant, 132
Daly, 162
Davidson, 192
Davis, 177
Deese, 155
De Montgremier, 185
De Roo, 186
De Tempe, 137
Devay, 178
Dimond, 152, 187
Dolan, 173
Doling, 137
Duffus, 138
Dutta, 139
Eckert, 168
Edgington, 152, 187
Eide, 181
Elenkov, 188
Endo, 171
English, 177
Enikeev, 162
Etheridge, 129
Ferguson, 153
Firman, 169
Fordyce, 179
Fraselle, 179
French, 192
Fulton, 177
Futrell, 165
Garber, 168
Garrett, 161, 162
Garriss, 131
Gasiorkiewicz, 171
Gegenava, 151
Gel'tser, 179
Gillespie, 192
Gilmer, 178
Globa-Mikhailenko, 129
Gold, 173
Golovin, 151
Gore, 165
Graham, 174
Grant, 188
Greeley, 163
Green, 156, 179
Grosclaude, 185
Guengerich, 175
Guzmán, 137
Guzmán N., 181
Haasis, 172
Hagen, 164
Hall, 139
Halmos, 179
Hamilton, 177
Hanger, 169
Hansen, 161
Hansing, 162
Hanson, 173, 174
Hare, 185
Hart, 162
Hasimoto, 130
Hayslip, 187
Heidrick, 181
Heim, 137
Hendrix, 172
Henner, 141
Hepden 154
Hewitt, 142
Heyne, 139
Hildebrand, A. C., 172
Hildebrand, E. M., 182
Hobbs, 165
Hodges, 131, 172
Hoffmann, 170
Holton, 163
Honma, 139
Hood, F. A., 192
Hood, J. R., 130
Hooper, 136
Horsfall, 152
Hosaka, 129
Houston, 191
Hull, 135
Huni, 130
Igarashi, 192
Itakura, 135
Itô, 129
Iyengar, 130
Jarvis, 158
Jayaraman, 184
Jennings, D. L., 139
Jennings, P. R., 167
Jensen, 162
Jewell, 131
Johnson, E. M., 186
Johnson, H. W., 172
Johnston, 151, 154
Jones, 172
Kalashnikov, 166
Kamei, 192
Kando, 135
Kankam, 164
Kechek, 166
Kelbert, 187
Kelman, 131, 186
Kendrick, 163
Kennedy, 178
Kharkevich, 157
King, 178
Kivi, 173
Kline, 164
Klinkowski, 159
Knight, 188
Kocková-Kratochvílová, 136
Köhler, 180
Kolbezen, 168
Kollmer, 180
König, 156
Korobeĭnikova, 173
Kosmakova, 180
Kristensen, 130
Kuć, 154, 188
Kuntz, 191
Lahr, 163
Lambe, 171
Lane, 134
Larson, 180
Latch, 174
Latterell, 167
Leaphart, 131
Lefebvre, 163
Lindberg, 165
Line, 181
Lingappa, B. T., 157
Lingappa, Y., 157
Linzon, 131
Lockwood, 157
Lucas, 185
Luepschen, 176
Luttrell, 138, 165
Lyubarskiĭ, 190
Maácz, 166
Maat, 173
Mace, 179
Mankin, 167
Martin, P., 187
Martin, W. J., 182
Maruzzella, 152
Mather, 162
Mathiesen-Käärik, 132, 133
May, 192
McKinney, 163
McLean, 137, 138, 160
McNeel, 134
McRitchie, 187
Melik-Khachatryan, 157
Meyer, 156
Meyers, 155
Middleton, 142
Miller, C. W., 162
Miller, P. W., 178
Millikan, 175
Mirocha, 178
Moens, 179
Moorhead, 159
Moreau, 153
Morton, 164
Munnecke, 153, 172
Murakishi, 139, 187
Murthy, 154
Nichols, 177
Nigam, 170
Nikai, S., 135
Nutman, 170
Ochs, 140, 142
Ogawa, 177
Oku, 167
Ono, 192
Osterwalder, 175
Parmeter, 130
Pascoe, 134
Paul, 129
Peace, 191
Petrescu, 141
Phillips, 171
Piekarczyk, 146
Pieri, 142
Posnette, 174
Powell, 176
Pratt, 173
Price, 178
Prindle, 155
Protsenko, 160
Quantz, 173
Raabe, 172
Rafailé, 141
Ranganathan, 170
Rayner, 169
Reifman, 180, 182
Reinert, 172
Reitz, 151
Reynolds, E. S., 155
Reynolds, J. D., 137
Rich, 152
Richards, 142
Richardson, 137
Riffle, 131
Riggenbach, 182
Roane, 161
Roberts, 170
Robson, 159
Roff, 133
Rosenberg, 177
Ross, 185
Rowan, 132
Rudman, 133
Russell, 135
Sadýbekov, 136
Saksena, 172
Sarkar, 183
Savin, 141
Scheffer, 134
Scott, 173
Scrandis, 152
Seeliger, 158
Sen Gupta, 170
Shaw, 131
Shen, 133
Shenefelt, 134
Shukla, 170
Simonyan, 158
Sinclair, 188
Skepper, 175
Skotland, 179
Sluijsmans, 181
Smarods, 129
Smiley, 186
Sokolova, M., 181
Sokolova, T. E., 134
Sommereyns, 160
Sowell, 139
Sparrow, 158
Spire, 136
Stabnikov, 134
Stahmann, 155, 182
Stall, 188
Stokes, 186
Strider, 139
Strong, 131
Surany, 152
Svobodová, 185
Tandan, 170
Taschenberg, 141
Taylor, D. P., 138
Taylor, G. S., 186
Terashita, 129
Thomas, 129
Thresh, 160
Thurston, 181
Till, 136
Timofeeva, 134
Tinsley, 160
Tomiyama, 182
Tool, 164
Townsley, 185
Tranina, 156
Tsao, 168
Tserling, 131
Tullis, 167
Turner, 160
Tweedy, 176
Uritani, 182
Vágás, 166
Valleau, 186
Valošková-Kotulová, 136
Van der Spek, 171
Vasil'eva, 153
Vasil'kov, 157
Venkata Ram, 183, 184
Vlasyuk, 174
Vuittenez, 140
Waggoner, 186
Wagnon, 177
Wallace, 167
Walter, 187
Ważny, 133
Wernham, 165
Wharton, 160
Wilcoxson, 161, 166
Willis, 180
Wilson, C. L., 192
Wilson, E. E., 177, 178
Winstead, 139
Witkowska, 162
Witkowski, 162
Wyllie, 138
Yakimov, 190
Yen, 183
Yokota, 192

SUBJECT INDEX

GENERAL
REPORTS, **142–151**, from
Cameroons Development Corporation, 148
Ceylon, 182–183
E. Africa, 148
Florida, 148–151
Forest Research, Great Britain, 188–189
Malaya, 154
National Inst. agric. Bot., 142–143
Netherlands, 144–146, 176
N. Borneo, 151
Poland, 146
Scottish hort. Res. Inst., 143–144
Tea Sci. Dept. United Planters' Assoc., S. India, 183
U.S.S.R., 146–148, 157–158
BOOKS, **151**, 155, 157, 158, 159, 161, 167, 173, 174, 190
BACTERIA, 139, 145, 146, 148, 150, **151**, 153. 170, 177, 186, 187, 192
Deficiency Diseases, 163, 178, 181–182, 184
ENTOMOGENOUS FUNGI, **152**
FUNGICIDES, 131, 133–134, 135, 136–137, 138, 141, 142, 145, 146, 147, 148, 149–150, **151–153**, 162, 164, 167, 168, 169, 171, 172, 174, 175, 176, 177, 178–179, 181, 182, 183, 184, 187, 188, 189
Antibiotics, 161, 189
INDUSTRIAL, 145–146, 152, **153**
Root Rots, 131–132, 138, 145, 157, 175
SOILS AND FERTILIZERS, **155–157**, 175
SYSTEMATIC MYCOLOGY, 129, 151, **157–158**
TECHNIQUES, 132–133, 134, **158–159**, 166, 175
VIRUSES, 135, 136, 137, 139. 140–141, 143–144, 145, 147, 148, 149, 150, 151, **159–160**, 161, 164, 168, 172, 174, 175, 177, 178, 180–181, 182, 184–186, 187
DISEASES AND DISORDERS OF
CACAO, 151, **160**
CEREALS, **161–167**
Wheat, 142–143, 156, 158, 161–163, 164
Barley, 142–143, 145, 163–164
Oats, 149, 161, 164–165
Maize, 147, 148, 161, 165–167
Rice, 151, 167
Sorghum, 167
CITRUS, 149, 150, **167–168**, 175
COFFEE, 148, **169–170**
COTTON, **170**
FIBRE PLANTS, 145, 151, **170–171**
FLOWERS AND ORNAMENTALS, 149, 150, 160, **171–173**
FODDER AND HERBAGE CROPS, 148, 149, **173–174**
FRUIT, **174–179**
Pome fruit, 144–145, 155, 174, 175–177
Soft fruit, 143, 144, 146–147, 150, 178
Banana, 178–179
Tropical fruits, 148, 149, 150
HOPS, **179**
OFFICINAL PLANTS, 147, **179**
PALMS, **179**
Oil, 148, 179
POTATO AND SWEET POTATO, 143, 145–147, 150, 154–155, 156, **179–182**, 186
RUBBER, **182–183**
SUGARCANE, **183**
TEA, **183–184**
TOBACCO, 143, 145, 148, 149, 151, 157, 158, 160, **184–186**, 187
TOMATO, 143, 145, 146, 150, 155, 158, 179, **187–188**
TREES, **129–135**, 157, **188–192**
Broad leaf trees, 129–130, 189–192
Conifers, 131–132, 147, 188–190, 192
Timber, 132–135, 155–190
VEGETABLES, **135–140**
Beet and Sugar beet, 135–136
Watercress, 136–137
Legumes, 137–138, 148, 149, 157, 160
Onions, &c., 130
Lettuce, 138, 145
Capsicum, 139
Cucurbits, 139, 145, 147, 150–151, 158, 160, 185–186
Tropical vegetables, &c., 139–140